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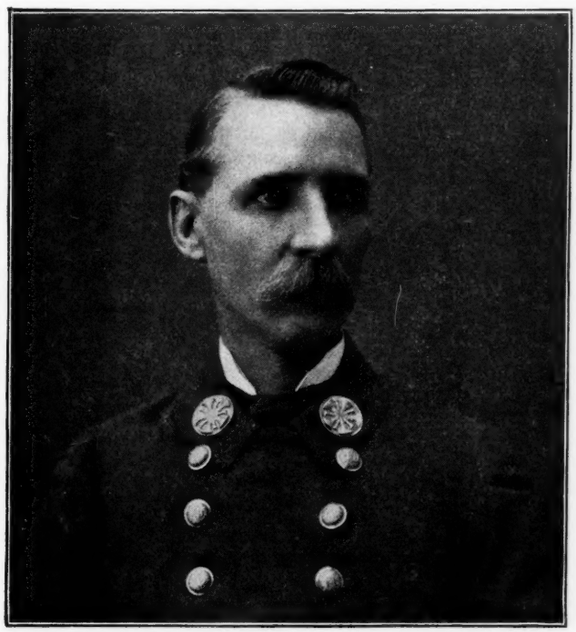
AMERICAN FIRE CHIEFS' CONVENTION.

St. Louis Meeting Opens with Large Attendance from All Sections of the Country.

Papers of Chief Roberts, Chief Devine, Chief Dickinson and Capt. Brophy, Published in Full.

[SPECIAL TELEGRAM TO CITY GOVERNMENT.]

ST. LOUIS, MO., October 18.—The twenty-sixth annual convention of the International Association of Fire Engineers was called to order by President Kennedy this morning, with representatives from all sections of the country in attendance. Delegates are still coming in and by to-night it is expected that more than 1,200 will be present. The representation from the East is very large. Reports of the officers, presented to-day, show the association to be stronger in membership and in all other respects than ever before. It is generally conceded that Chief Charles E. Swingley, of St. Louis, will be elected to the presidency of the association. The local arrangements for entertaining the visitors have been made on a most generous plan, and an exceedingly enjoyable time is assured during the week. The exhibits are numerous and include all of the latest and best appliances for the use of fire departments.



CHIEF CHARLES E. SWINGLEY, ST. LOUIS.

Four of the most important papers read at the convention are published in full for the first time in this issue of CITY GOVERNMENT, as follows:

PRACTICAL BENEFITS OF GYMNASIUMS TO FIRE DEPARTMENTS.*

BY W. E. ROBERTS, CHIEF ENGINEER FIRE DEPARTMENT, DENVER, COL.

Mr. President and Gentlemen of the International Association of Fire Engineers:

The subject of "Practical Benefits of Gymnasiums to Fire Departments" is one which is so familiar to many of you that I hesitated when asked to write this paper, feeling that it would be difficult to present to you many new thoughts or experiences, so I trust you will pardon me if in the attempt to precipitate discussion I bring to the attention of this meeting my ideas and experiences, which is, after all, the object of my paper. It is a subject of more than ordinary importance, inasmuch that it is a matter which should interest everyone connected with a fire department.

The physical condition of an applicant for the fire department is too often overlooked by those possessing the appointing power, who, in the anxiety to please personal friends appoint men who, from a physical standpoint, are totally unfit to perform the arduous duties required in their profession. The pages of mythical and ancient history teem with anecdotes of terrific battles between opposing armies, and of personal encounters that seem incredible in our time, all of which tend to demonstrate that physical culture was the chief attribute toward success in mediæval days. The successful gladiators of ancient Rome while battling in the arena owed their very existence to the splendid physical condition of their bodies, which thus enabled them, although pitted against men of equal courage, to invariably emerge from the fights unscathed and victorious. In alluding to the above matters, I do so with the object in view of showing the vital necessity of keeping the body in perfect physical condition.

In our days the daily newspapers devote columns describing the methods used in the training of some great pugilist or bicycle rider. If it is so essential for a pugilist to train for two or three months prior to an engagement which might not last but a few moments, and at the most but two or three hours, how much more requisite that our fireman should be in condition to protect his own life as well as the lives of others, and to endure the hardships necessarily imposed upon him in his chosen profession. So that when confronted with dangerous or sudden emergencies his physical condition and frame of mind are equal to the demand made upon him.

The importance of having well-equipped gymnasiums in connection with fire departments must devolve upon those in control, for these persons look to the men for efficient work, and I contend a high degree of efficiency can only be brought about—in addition to perfect discipline—by perfect physical development.

From observation and knowledge it is my honest conviction that Denver possesses the most complete and modernly equipped gymnasium in these United States, and that we have the only regular school of instruction where it is as much the duty of the fireman to attend his class

*Paper read at St. Louis Convention of International Association of Fire Engineering, October, 1898.

hour, on regular assigned days, as it is to discharge any other of his duties.

For your information I shall proceed to give you an idea how we succeeded in the introduction of gymnasium work in our department. About a year ago Hon. Ralph Talbot, our fire commissioner, visited the Eastern fire departments, with the object in view of gleaning information which would prove beneficial to the Denver fire department. He was very much impressed with the discipline and good order prevailing in the large Eastern cities, and particularly so with the gymnastic appliances displayed in those departments. The result of his observations was a revised manual containing new rules for the better government of our department, and I am pleased to say that never were the rules so well enforced or the discipline more strict than at the present time; but in my opinion the greatest improvement of all was a new rule that went into effect subjecting new applicants to a rigid mental and physical examination. Instead of old-time politicians of uncertain age, all of the new appointees were young men of excellent physique, who had passed a good mental and physical examination.

By the individual effort of each member of the department sufficient money was raised to contract with the Simmons Hardware Co., of St. Louis, to furnish and equip our gymnasium with the most modern apparatus obtainable, being manufactured and delivered by the Spaulding Brothers, of Chicago. We paid $1,200 for the appliances and apparatus, which would have cost about $1,800 had it not been for the discount we received. Our lockers, shower baths, etc., cost us $500 more, or an aggregate of $1,700. On April 18, 1898, the gymnasium was dedicated to the fire department, and congratulatory speeches were made by some of our leading citizens.

As usual in such cases there were several wiseacres who shook their heads, and said it was simply wasting money to give firemen such splendid quarters and appliances. How sadly they were disappointed is now a matter of record. Our method of conducting the school of instruction is as follows: There are just one hundred regular men in our department. The instructor, Capt. A. L. Graeber, of Engine Co. No. 6, who ranks second to none in these United States as an all round athlete, as evidenced by acts of Congress awarding him medals for athletic bravery, has absolute control over all the men while in the gymnasium. Our rules are so strict that it is an easy matter to regulate the behavior of the men while at class work. We have divided our hundred men into five classes of twenty men each. Monday morning at 9:30 the first class of twenty appear at the Central Headquarters, where the gymnasium is located. They immediately go to the dressing room, where they doff their uniforms, reappearing in their gymnasium suits, which consists of gymnasium shoes, long light colored pants and a black closely knit quarter sleeved shirt. Dressed in this manner and at the command of the instructor they fall in line, at another command they commence to run around the large room for a period of ten minutes, thereby creating a perfect circulation and the perspiration to flow freely.

The class is then sub-divided into two classes of ten men each, and then put through various exercises, such as work on the parallel bars, vaulting, jumping, climbing ropes hand over hand, rope ladders, pompier ladders, jumping from high distances and jumping over space, etc. These exercises are kept up for a period of an hour, and when the men are dismissed they are sent to the shower baths, where water is furnished them at any degree of heat desired, as indicated by a thermometer placed in series with the water pipes. Tuesday, Wednesday, Thursday and Friday the remaining four classes appear and execute the same movements and are put through the same instruction as was the class on Monday. Saturday being our regular cleaning day, the men are exempt from gymnasium work and are also excused on Sunday. The exercises and course of instruction are changed on each succeeding Monday, new features being introduced.

The question naturally arises: "How can you manage to get twenty men to your gymnasium without weakening your department?" This is easily answered. We have fourteen companies; the men are all back from breakfast at 9 o'clock, the small outside companies send one man each morning, the larger companies in the downtown districts send two and three men each. The fact is that we have the same number of men in quarters during gymnasium hours as are in quarters during meal hours, and in the event of a large fire but little time would be lost in getting the men to the fire. In addition to the regular gymnasium there are located in each fire house a wall machine, a disc, punching bag, Indian clubs, dumbbells, etc., and during the week, while absent from the gymnasium proper, each member of a company is compelled to regularly exercise for a period of fifteen minutes both in the forenoon and afternoon. You will therefore perceive there is no possible chance for a fireman in our department to become inactive.

As might have been expected in the beginning there was a certain amount of opposition shown to this innovation by some of our men, but they soon took a liking to the work, and now feel proud of their accomplishments and performances in the gymnasium. As an illustration of the benefit derived by our men through regular and continuous exercise, and their physical condition at the present time, I take pleasure in stating that twelve of the same men gave an excellent exhibition in the presence of ten thousand people during the late Festival of Mountain and Plainhold in Denver. The feats performed were building a human pyramid, exercises on the parallel bars, high jumping, etc. But the feature that captured the vast crowd was the spectacle of seven firemen beating the picked runners of the entire Apache and Ute tribe of Indians. Last year our firemen were easily defeated by the same Indians, and this incident in itself shows the vast improvement that has taken place in the physical development of our men. I now come to the most important part of my subject, which necessitates a little caution. It is an easy matter to establish a regular school of instruction, such as we have, in cities like Kansas City, Omaha or Denver, etc., where there are only about a hundred regular firemen employed; but in cities like New York, Chicago, Boston or St. Louis, etc., it would be a very difficult matter. I have read of the school of instruction and the methods used to teach new men the exercise of correct judgment in relation to the art of fighting fire. I believe that the time has come when the advantages to be derived from gymnasiums, whether centrally located or in the separate districts, or in part in the various engine houses of the larger cities, will be more thoroughly understood, and requisite measures taken to thereby greatly improve the fire service.

It is a fact conceded by all lovers of athletic sports, that it takes months of earnest, steady training, together with self-restraint, to train for fistic events, running, rowing, etc. How much more essential to have our firemen in continual training and developing their muscular power, preparing and familiarizing themselves with the implements on the apparatus to which they are assigned, so that when called upon to perform some extra or hazardous duty, they will not hesitate to emulate the examples set by the O'Tooles, the Hesters, who strove not to kill their fellow men, but imperilled their own lives to save the precious lives of others. Their gallant deeds will be long remembered by a grateful people, and their names, like the ancient Greek heroes, handed down to pos-

terity. The time is rapidly approaching when the fireman will be appreciated to a greater extent than ever before by the general public. It is a healthy sign of the times to notice the determination of the people generally, throughout these United States, to withdraw their fire departments out of the field of politics.

I wish to assure my hearers once again, and I speak advisedly, that the most imperative duty of a modern fire chief is to see that the physical condition of the men under his control is par excellence. Then how quickly you will notice the difference in their carriage; the men walk erect, their every movement is full of grace and manly bearing, and the best feature of all is the fact that they can endure twice the amount of hardship after a few months' training in the gymnasium. I advise those who have not got a gymnasium to take immediate steps toward getting one. Let your paraphernalia be the very best that money can procure; get a first-class instructor, if you haven't the money to pay for one appoint a good athlete from one of your Turnvereins or athletic clubs and make him your teacher; purchase the appliances necessary to familiarize your men with the same, such as siamese, door openers, fire hydrants, the use of hose jackets, etc. Take my word for it you will never regret the expenditure incurred; and for my part I feel more than proud of our men, who, in the short space of four months, have improved so wonderfully that visitors who saw them perform during the festival referred to would hardly believe that they were regular firemen, but insisted that they certainly must be professional acrobats. I venture the prediction that within one year from this date Denver will possess a body of firemen unequalled in their physical qualities. In conclusion let me say that the practical benefits of gymnasiums in fire departments are better health of the men, development of body and mind, agility, higher efficiency, greater self-reliance and better discipline.

STYLE OF HORSE BEST SUITED TO THE FIRE SERVICE.*

BY JAMES DEVINE, CHIEF ENGINEER FIRE DEPARTMENT, SALT LAKE CITY, UTAH.

Mr. President and Members of the International Association of Fire Engineers:

"What Style of Horse Is Best Suited to the Fire Service? And Is Breeding Essential?" I appreciate this topic cannot be fully treated in this, the initial address on that very important and far-reaching subject. Since the assignment of this question to me, and that it has received some special thought and attention at my hands, I began to realize more fully its magnitude and imporance as a proper subject for discussion at the meetings of this association. Some of us have been for the past quarter of a century, at these annual meetings, discussing the uses and merits of all kinds of fire-fighting appliances —steam fire engines, hook and ladder trucks, chemical engines, hose, hose couplings, nozzles, etc., but the noble animal, who has been the motive power on all occasions —almost the equal of the intelligent fireman in the knowledge of his duty, and as faithful and as loyal in the execution of his part—has been almost forgotten. That this is a fact seems almost a surprise, for upon the faithful and efficient service of the fire horse the paid fire department of to-day is dependent to a very large extent. Show me a fire department that has become celebrated for its promptness and efficiency, and I will point out to you in its engine houses horses that are marvels of intelligence, speed and endurance. Why then should not we as lovers of this noble animal, as associates of his in danger and duty, discuss fully and intelligently this comrade so near and so dear to us—until in the grand march of progression toward perfection by our knowledge and experience the fire department service of the world will beyond all question maintain for this devoted and intelligent friend his rights to wear the crown in the animal kingdom. Many of our fire stations throughout the country are thronged from day to day with visitors—who come for what purpose? Not to examine our engines and trucks, but to see the always willing fire horse perform his part, and they go away marveling at how he played his rôle.

As stated at the beginning of this address I shall not assume, nor do I claim, the capacity to treat this question fully on this occasion, but some ideas I may present shall furnish food for thought—sharpen the appetite of my hearers for investigation and lead, I trust, in the future to a more thorough and comprehensive discussion of this subject.

"What Style of Horse Is Best Suited to the Fire Service?" Some horsemen might assume that I had determined to confine my choice to some recognized breed of horse that has achieved some reputation for possessing the various requirements that are generally admitted as necessary qualifications for this character of service.

I choose to first designate, in a descriptive way, what should be the general make-up of a fire horse without going too fully into fine details. I shall afterward see how nearly we can find this horse among the stud farms of the present who claim to raise blooded horses of their various kinds. The ideal fire horse should weigh not less than 1,275 pounds nor more than 1,600 pounds when in proper flesh for good hard service. The minimum weight of course would apply to the lighter service, such as chief's buggy horse, and for the lighter class of apparatus, while the maximum weight would be used for moving heavy engines, trucks or water towers. Those horses should vary in height from sixteen to seventeen hands. The color should be of some recognized standard shade, though I consider this more a matter of sentiment than necessity. He should not be less than five years old nor more than seven when put into service.

We have now got a horse of the right height, weight, color and age, but we come to the most important qualifications: "disposition" and "make-up." A good fire horse should have what we term in man a most amiable disposition—kind, docile and tractable—free from vicious habits, either by acquisition or heredity. He should be quick to learn and prompt to obey. In short, the disposition that is usually required for a good fireman is also required for a good fire horse.

This feature I shall endeavor to state very briefly, considering its importance, as to go into it fully would require much statistical detail that it is unnecessary to present at this time. It goes without saying that we must follow the Scotchman's idea and commence near the bottom, and in designating the respective points with regard to their relative importance I should place limbs first, feet second and lungs third. I will here quote in part from one who is recognized as authority the points covering physical perfection and conformation of the horse, though in some few points I feel constrained to differ with this authority, and on such points choose to present my own conclusions in so far as they apply to the horse in question:

"The points of the physical structure of a horse on which the most, indeed the whole, of his utility depends, are his legs. Without his locomotors all the rest, however beautiful it may be, is worth nothing. Therefore, to those we look first. The foreshoulder should be long, obliquely set, with a considerable slope, high in the with-

*Paper read at the St. Louis Convention of the International Association of Fire Engineers, October, 1898.

ers and thin above. The upper arm should be very long and muscular, the knee broad, flat and bony; the shank, or cannon bone, as short as may be, flat, not round, with clean, firm sinews; the pastern joints moderately long and oblique, but not too much so, as the excess produces springiness and weakness; the hoofs firm, erect or deflecting as opposed to the flat, and the feet generally large and round. In the hind legs the quarters should be large, powerful, broad when looked at in profile, and square and solid from behind. The hams should be sickle-shaped, not straight, and well let down, so as to bring the hocks well toward the ground. The hocks should be large and bony, straight, not angular, and convexly curved in their posterior outlines; the shanks, corresponding to the cannon bones, short and flat, and the hind feet similar in form to the front. The back should be short above from the point of the withers and shoulder blade, which ought to run well back to the croup. The barrel should be round, and for a horse in which strength and quickness are looked to more than great speed and stride, closely ribbed up. A horse can scarcely be too deep from the tip of his shoulder to the intersection of his foreleg—which is called the heart-place—or too wide in the chest, as room in these parts gives free play to the most important vitals. The form of the neck and setting on of the head are essential not only to the beauty of the animal but to the facility and pleasure of riding and driving him; hence, with an ill-shaped, short, stubborn neck, or ill set on head, the animal cannot by any possibility be a pleasant mouthed horse, or an easy one to manage. The neck should be moderately long, convexly arched above from the shoulders to the crest, thin where it joins the head, and so set on that when yielding to the bit it forms a semicircle, like a bended bow, and brings the chin downward and inward until it nearly touches the chest. Horses so made are always manageable to hand. * * * The head should be rather small, bony, broad between the jowls, broad between the eyes, and line of face nearly straight. The ears should be fine, small and pointed; the eyes large, clear and prominent, and the nostrils wide and well opened."

A horse so framed cannot fail, if free from physical defects, constitutional disease and vice, and of the size herein required, to be a good one for our purpose.

Such a horse as I have here described of proper breeding, and with proper training, should make an ideal horse for the fire service. I am not of the belief that any one breed of horses on the market to-day meets this standard. Though I do believe the horse coming nearest to it is the French Coach, this is probably in a great measure due to the fact that France and the French Government have, consistent with their characteristic pride, done more to make the name of their horses famous than has any other nation. Long before the reign of Louis XIV., or Napoleon the First, when the French cavalry horse was the pride of the army; yes, more than 200 years ago, Governmental aid was invoked to elevate the standard of the French horse. And here I shall ask your permission to briefly quote from the work of J. H. Sanders on this subject, who says:

"It must not be understood from what has been said in the foregoing that the breeding of coach horses is carried on throughout all of France, nor that the use of thoroughbred stallions is now discouraged by the Government. It is only in the departments of Orne, Calvados, Manche, Seine-Inférieure, and a part of Eure that the attention of the Government is especially directed to the production of coach horses. In the departments above named there are two Haras, or Government stables, one at Pin and the other at St. Lo. In other departments, as in Le Perche, attention is chiefly given to the Percheron, while the Boulonnais, the Breton and the Thoroughbred are encouraged elsewhere. It may also be of interest to note in this connection that in addition to the stallions owned by the Government there are two classes of stallions of various breeds owned by private individuals that may be mentioned as receiving Governmental recognition. First, 'approved' stallions, which, after inspection by the authorities, are granted a subsidy for remaining in the country and serving mares at prices fixed by their owners. This subsidy amounts in the case of thoroughbred stallions to from about $150 to $500 a year. Coach horses (demi-sang) $75 to $150 a year; and draft horses from $50 to $100 a year. The second class is authorized upon inspection to serve mares, but receive no subsidy. No stallions excepting those belonging to the Government, and those that are approved or authorized, are allowed to do stud duty."

I have given the French coach horse precedence here because in my judgment he is about the only horse being raised to-day of which I am advised that possesses the necessary activity and endurance combined measurably with size to nearly meet the standard I have fixed. I do not believe that the average French coach possesses the necessary size, though many can be found weighing from 1,300 to 1,400 pounds. The Percheron, another French horse for whom I have a good deal of regard, possesses the size, but seldom, so far as my experience extends, the necessary activity—though some eminent authorities claim that he is the true type of horse for carrying a load with great rapidity. I am free to confess that much of the prejudice existing against the Percheron horse in America is due to the fact that his name has been associated with what we know as the Norman, but what I believe in France is termed Boulonnais. I will dismiss the Norman horse by saying that he has no business in this address, not certainly in any fire department, as he possesses none of the qualifications except weight, and his name should never be confused with that magnificent specimen of the equine family known as the Percheron. There are two other kinds of horses known as the English Shire and Clydesdale, so similar in general conformation that I shall speak of them together, though I lean to the opinion that the Shire horse should have precedence in this address. I do not consider either of these breeds as possessing the necessary activity and speed for our service.

In concluding the first part of my subject in this way I necessarily take the position that breeding is essential, for I have not found in the various separate and distinct breeds my ideal.

I cannot understand why the enterprise of the American horse-breeder has not long ago suggested to him that a wide and profitable field is open for this great industry. The horse which I have described, but which I claim cannot be usually found in any one of the horse families, must be raised by inter-breeding, and I now come to the point which at this time I hesitate to speak upon definitely, but in general terms will say that in my opinion the horse I have described can be produced by crossing specially selected Shire or Percheron mares with the Thoroughbred horse, or probably to increase the size of the get, a half-thoroughbred and half-French coach horse would be better. We find in our departments to-day some horses that nearly or quite reach the standard named, but they are of mixed breeds, usually the progeny of different styles and sizes of horses for some generations. As an example of this we have in the Salt Lake Department to-day a horse 16¾ hands in height, weighing over 1,600 pounds, who, with his mate, has a hitching record, standing 14 feet from his collar, of 2 1-5 seconds; who has a record of hitching and moving an apparatus weighing 5,100 pounds 36 feet in 5 2-5 seconds, and who, with his mate, pulled this same apparatus

660 feet, or one-eighth of a mile, in 18 4-5 seconds. This horse was foaled by a mixed blood Morgan mare weighing about 1,100 pounds, and his grandsire was a horse weighing about 1,350 pounds, who was brought from Canada, but of whose ancestry we have no true record. I do not mention these records made by this horse for the purpose of comparison with smaller horses who have made world-wide records, but I do claim that any horse weighing from 1,600 to 1,650 pounds that can handle himself in this way has some of the blood that should course through the veins of my ideal fire department horse.

AUXILIARY PIPES OPERATED BY FIRE BOATS.*

BY JAMES WHITNEY DICKINSON, CHIEF OF FIRE DEPARTMENT, CLEVELAND, OHIO.

Mr. President and Members of the International Association of Fire Engineers.

Gentlemen—I have the honor to make the following report on Topic No. 5, assigned to me by our executive committee. Subject: "Auxiliary Pipes Operated by Fire Boats."

During the years of and from 1886 to 1891 we had several occasions to use the fire boat streams inland, necessitating the laying of thousands of feet of 3½ inch hose, up hills ranging from 70 to 94 feet above the level of the river, and requiring a water pressure of from 200 to 300 pounds, which resulted in great wear and tear on the hose. It was then that iron pipe was first introduced for fire boat use.

The topography of Cleveland is different from that of other cities operating fire boats, because of the fact that on each side of the Cuyahoga River steep grades—from 70 to 94 feet—arise, up which the water must be forced before the level streets of the city are reached. Other cities with little or no rise from the water front would be rid of one of the most difficult obstacles which confronted us in establishing our system, but we find in our experience that if the machinery and hose are made of sufficient strength we can do excellent and efficient fire service at least one mile from the fire boat.

I recommend, for ordinary cities, pipe lines of 10 inches in diameter for main lines, and 8 inches for street and hydrant branches, with valves at hydrants, and gates at street intersections, to limit the amount of pipe to be filled in each case, also with sewer connections, so as to be used as a wet or dry system. Great care should be taken to have the pipes laid properly, with round bends, and they should be tested to 400 or 500 pounds. The pumps, connections and hose should be as strong in proportion.

With a proper telegraph system, that is, cables laid in the same trench, with accurate instruments and connections at each hydrant and at the boat, it is possible to start and stop the pump on the fire boat as quickly as a land engine at the same hydrant.

There can be no doubt as to the feasibility of this system of utilizing fire boats for inland work, as it is working successfully now in Cleveland, Detroit, Milwaukee, Buffalo and Boston. I will quote from Chief Bonner's report of the New York Fire Department to the Hon. James R. Sheffield, President of the Board of Fire Commissioners, of that city:

"Cleveland has about three miles of 8 and 10-inch cast iron pipe, leaded joints, tested to 400 pounds, hydrants 200 feet apart, two 3½-inch hose with independent shut off at each hydrant, overhead electrical connections from hydrant to boat, wet or dry system. Detroit has five miles of wrought iron pipe, 8 to 10 inches, laid with sleeve and screw joints, tested to 500 pounds, and supplied with air valves. Milwaukee has seven and a half miles of 6 to 10-inch cast iron pipe. Buffalo has 6,200 feet of wrought iron pipe, laid with sleeve and screw joints, tested to 500 pounds; dry system and improved four-way connection to hydrant. Boston has recently laid 4,000 feet of extra heavy 12-inch cast iron pipe, hydrants 200 feet apart, underground electrical connection with fire boat; wet or dry system. Chicago has a large appropriation to expend in establishing a pipe system."

It is astonishing the encouraging effect which these fire boat streams have on the firemen. When they see one or more streams from the fire boat playing on the outside to assist the streams from the land engines, they go right in and up. The large streams knock out the fire and smoke from the outside, and the small streams finish the work. The large lines of hose are often reduced to two single streams, and led up and through the buildings, and in that way land engine companies are relieved and returned to quarters.

At a meeting of the American Water Works Association, composed of intelligent and scientific men, held in Brooklyn, N. Y., May, 1892, the subject of the Cleveland fire boat pipe line system was brought up for discussion, and it was almost the unanimous opinion of this learned body that the scheme was ridiculous and impracticable, and could not be efficiently operated. After no little ridicule the paper pertaining to this plan was cast into the waste basket, and at that very time, right in Cleveland, this system was being looked upon by the local water works authorities in much the same manner as the association regarded it; the objections being that the air in the pipes would destroy the streams, forgetting that, in this century, the air chamber, added to the force pump, made it a success, and the air in the pipe ahead of the water being compressed made an additional air chamber for the fire boat pumps, thus relieving the strain on them.

In Detroit, during the time of our late brother chief, James Elliott, he showed me six 1¼-inch streams, located at the Grand Circus, about one mile from the fire boat, and with an elevation from the river level of about 40 feet, of such splendid force and volume as would make glad indeed the heart of any fire chief who was in the midst of "a hot old time in his town."

In conclusion, I wish to say that if there is any city contemplating the construction of such a pipe system, I will gladly furnish any information which our experience has taught us, and at any time will be pleased to exhibit the working of our system.

*Paper read at St. Louis Convention of International Association of Fire Engineers, October, 1898.

THE DANGER OF SHOWING PICTURES BY THE VITASCOPE AND OTHER LIKE MACHINES.*

BY CAPT. WM. BROPHY, CHIEF ELECTRICIAN OF THE CITY OF BOSTON.

Mr. President and Fellow Members of the International Association of Fire Engineers:

When I received a request from our secretary to prepare a paper on "The Danger of Showing Pictures by the Vitascope and Other Like Machines," I was a little surprised; but when I remembered that one serious fire was caused by one of these machines that was improperly installed and operated, in a city but a short distance from Boston, and that fires of a like nature have occurred in other parts of the country, I perceived the necessity of a more extended knowledge of this subject on the part of the fire chiefs of the country, and that the best medium through which such knowledge could be imparted was this association, whose mission it is to educate its mem-

*Paper read at the St. Louis Convention of the International Association of Fire Engineers, October, 1898.

bers not only as to the best method of extinguishing fires but of preventing them.

To the older members of this association the time when only the rich and well-to-do could afford to have "the human form divine" transmitted to canvas, so that it could be handed down to posterity or exhibited to admiring friends, seems not far distant. Not until the wonderful discovery of Daguerre, whereby he pressed that wonderful life-giving power—the rays of the sun—into the service of man, and by means of the camera obscura fixed on metal plates perfect likenesses of all objects in repose, could the average man afford a likeness of himself. That great luminary that is the source of all plant life and makes this planet of ours inhabitable, replaced the artist who deftly wielded the brush and palette, and improved on his best work at so small a cost that the humble home of the poor and the more pretentious ones of the more fortunate class contain the likenesses of dear friends present, absent or dead.

Next came the ambrotype, a form of picture taken on glass. This was an improvement on the daguerrotype. Later came the tintype; this kind of a picture was taken on a tin-plate. But the art of making pictures was not brought to its present degree of perfection until the advent of the photograph, whereby the image or objects embossed on the glass or negative plate are reproduced on paper, also by means of the rays of the sun.

Having brought the art of photography to its present state of perfection when applied to stationary objects, active minds were applied to the problem of obtaining perfect pictures of moving objects. Step by step this desired point was reached until animated photography has now become a very thriving industry, and the exhibition of animated pictures is fast becoming a standard attraction in theatres and other places of amusement.

Who among you have not seen the march of infantry, the charge of cavalry, the steam fire engine and hose wagon, and the horseless engine as caught by the camera and projected on canvas, every movement of which appears as real as though the original subjects were passing before you. The merry pranks of happy childhood, the more sedate movements of their seniors; scenes solemn and ludicrous are caught by the camera and thrown on the screen for our pleasure and edification. As the phonograph records and reproduces articulate speech, the strains of the sweet singer and the voices of loved ones passed away, so animated photography reproduces the most intricate movements in a most realistic manner.

It is said with some degree of truth that the projection of animated pictures on the screen is attended with some considerable amount of fire hazard. It can also be said that serious fires have resulted from such exhibitions, but it can also be said that the fire hazard resulting from such exhibitions can be reduced to a minimum, if not entirely eliminated, by attention to details in the construction of the apparatus, and the necessary amount of intelligence in the operator.

I will now, with your permission, give a short history of what is known as animated photography, together with a description of some of the apparatus for taking and reproducing the pictures on the screen. To understand the principle upon which animated photography is based some knowledge is necessary of the underlying theory involved, viz.: persistence of vision. But this is a matter quite easily understood, as the theory is exceedingly simple to realize.

The retina of the eye has the physiological property of retaining for a short time the impression of an image after the object which has produced it has disappeared. The duration of this retinal picture is estimated at one-tenth of a second; the idea of discontinuity is lost, and the image appears to be in continual evidence. If the images shown to us are represented in the successive positions assumed by the object in motion the impression conveyed to the eyes is that of a continuous movement without intermission. If the photographs are presented to the eye at the same intervals as separate the successive exposures when they are taken the movement will appear as if it actually took place.

This property of the retina is termed persistence of vision, and it will be easily understood what bearing the phenomenon has upon animated photography. When the series of photographs is being passed across the surface upon which they are projected the eye is receiving probably between ten and thirty impressions per second; and, although these impressions reach the retina separately it will be understood that in consequence of the fact that each impression remains for an appreciable length of time upon the retina before it is, so to speak, obliterated by those which succeed it, the effect upon the brain is not that of a series of disconnected and independent communications, but of a continuous and persistent sensation. Hence it is that we get the phenomenon of apparent motion on the screen with which many of you are now familiar.

The first attempt at animated photography was by means of electrically controlled cameras for recording the movements of a horse passing in front of them. But the greatest impetus given to animated photography was probably given by Mr. Edison, who, in 1893, produced series of photographs of moving objects on perforated strips of celluloid films, such as are now used in the production of all animated photographs. The positives from the negatives thus made were converted into endless bands and these being electrically driven and illuminated, were viewed through a magnifying eye-piece, and, as between the eye-piece and the moving band a rotating slotted disk was interposed, which presented a new picture to the eye at each successive revolution, the observer obtained all the impressions of movement in the pictures. The kinetoscope, as it is called, was exceedingly popular for a time, and there is no doubt that it was the immediate forerunner of the present system of viewing animated photography on the screen, rather than on translucent films.

The cinematograph, which was exhibited in July, 1895, in Paris, France, was the first instrument devised to throw animated pictures on the screen to be viewed and admired by large audiences, the first pictures shown being the evolutions of cuirassiers, a factory, street scenes, a dinner party, and what would be of exceedingly great interest to you, a building on fire. What possibilities are opened up for the art of animated photography in depicting the scenes enacted at a fire! Not only the successful attack of the well-equipped, well-disciplined departments commanded by able chiefs, upon the flames, but the puny efforts of those misguided communities who fail to provide themselves with modern fire appliances, but depend on the forbearance of a kind Providence and the ancient unorganized bucket brigade; or those other benighted towns which possess an ancient hand engine stored in some shed or barn, where the brakes are used as hen-roosts and the tub as the domicile of rats and mice, while the ancient leather hose, if properly greased so as to make it toothsome to these rodents, is converted into perforated sprinklers. The frantic efforts of the fathers of such a town at the scene of a fire that was not expected or provided for, and the ill-directed efforts of those who were engaged in the laudable efforts of staying the progress of the flames, would be a sermon without words that the most dull of comprehension could understand and profit by.

To the solid citizen who can find no time to look into a fire department house, or attend a fire, unless it occurs on his own premises, and until then is prone to look upon the fire department as an expensive luxury and on firemen as men leading a life of indolence and thereby assisting to sap the life-blood of the taxpayer, what a fund of information is available through the medium of animated photography when depicting the active life of the firemen! These men would soon learn that the fire department is as indispensable as is the light of Heaven, and that money freely given for its maintenance is a wise investment; and that no money compensation can repay its members for the risks they run and the service they render to their fellow-men. There are others who could learn such lessons with profit, but most of you know them so well that I need not enumerate them at this time. My sympathies for my fellow firemen and my enthusiastic admiration for their calling have caused me to wander from my subject, to which I must now return.

The principal features of the cinematograph are a mechanism whereby the film is at rest during illumination, and an arrangement for projecting the images upon a screen so as to be visible to a large audience. Under these circumstances fifteen images a second are all that is necessary. The film is at rest for two-thirds of the time of the passage of each image. During the remaining third the film is grasped and pulled forward as far as the next image by a set of teeth attached to a frame, whose motion is governed by a cane working by a revolving handle. The same apparatus also serves for taking the photographs, and for printing transparencies from the negative film.

There are numerous forms of machines for producing animated photographs, among which are the projecting kinetoscope and the biograph, both being American inventions, the former being an improvement on the original machine invented by T. A. Edison, the latter being the invention of Mr. Casler, and as it has attained a considerable success in this country I deem it worthy of some consideration at this time, particularly as it has been in operation in the model theatre of this country, if not in the world, that of Mr. B. F. Keith, of Boston. For nearly two years it has delighted thousands of people of all classes and without a single hitch or accident to be charged up against it; were it otherwise it would not be tolerated for a moment in this model place of amusement, where everything that money can buy or man can devise is furnished for the comfort and entertainment of its patrons.

There are certain features about the method of obtaining and projecting photographs with this machine that are sure to be interesting, and I therefore give the following particulars, parts of which are taken from an article in the *Scientific American:* The camera frame is mounted by means of three adjustable legs upon a triangular turntable which may be placed upon any suitable support. Upon the top of the frame is bolted a two-horse-power electric motor, which is driven by a set of storage batteries. The combination of the turntable with the vertical adjustment before mentioned enables the camera to be shifted so as to take in the required field. In the front end of the camera is fixed a lens, capable of gathering a great flood of light and producing an image of exceedingly clear detail. Above this lens on the front face of the camera is fixed a finder, which gives the same sized image as the main lens. Inside the camera is a strip of film two and three-quarters inches wide, and about 160 feet in length, which is wound upon a small pulley or drum. The length of the film varies for different subjects, and in the case of prolonged scenes it may extend to several thousand feet.

The film is led through a series of rollers and caused to pass directly behind the lens of the camera, and finally is wound upon a second drum. The object of the rollers is to cause the film to pass behind the lens with an intermittent instead of a continuous motion. At ordinary speed this would seem to be a matter of simple accomplishment; but when we remember that impressions are taken at the rate of forty a second, and that the film, which is running at the rate of from seven feet to eight feet a second, has to be stopped and started with equal frequency, it can be understood that the problem was no easy one to solve. The film comes to rest as the shutter opens, a phase or image is deposited, and the film starts again as the shutter closes, the impressions varying in actual exposure between one-hundredth and four-hundredths of a second. While the ordinary speed is forty a second, the biograph can take equally good pictures at the rate of one hundred per second, if it is necessary. The higher speed would be used in photographing the flight of projectiles or any object that was in extremely rapid motion. The mechanism within the cabinet is driven by belting from the motor above mentioned, and the speed of which is controlled with great nicety by means of a resistance box.

We will imagine the apparatus in the act of photographing the five-hour limited on the Shore Line, running between Boston and New York, at the rate of about sixty miles an hour. The biograph is set up at the side of the tracks upon a solid platform, the stretch of track is properly focused by the operator, and at the moment the train comes into sight the current is turned on, the speed being regulated by the resistance box, as explained. By the time the last car of the train has flashed by, 160 feet of film has streamed past the lens, received its 1,000 impressions, and been wound with its previous record upon the receiving spool.

The biograph for projecting purposes is similar in its general appearance and construction to the apparatus for taking the photographs. There is a similar arrangement of rollers and mechanism for controlling the movement of the film, and the machine is driven as before, by an electric motor, and controlled by a resistance box. The chief difference observable in the interior of the biograph for projection, as compared with the camera, is that the former contains a hand-regulated arc lamp of 5,000 candle power, which is placed behind the lens. When a subject is to be thrown upon the screen a spool containing the positive film is placed in the cabinet, and run with an intermittent motion through the controlling rollers, down between the lamp and the lens, and finally wound upon a receiving spool. In order to insure that the best effect shall be secured, it is necessary to run the film at the same speed at which it was taken—a result which is obtained by the use of the tachometer. The whole apparatus and the operator are enclosed in a cabinet, which is located at the back of the entertainment hall, above the heads of the audience. A hole is cut in the cabinet for the lens, and there is a window for the operator.

I will now proceed to point out wherein the danger lies and the best means of reducing it to a minimum. The celluloid film, as most of you know, is very inflammable, and a flame brought in contact with it will quickly ignite it, and the rays of the powerful light when focused on one spot for a very short time will cause it to burst into flame. Should the film be accidentally interrupted in its passage between the lamp and lens, the film would quickly ignite, unless the rays of the light were quickly cut off by a shutter. If the ribbon of the film were allowed to reel off on to the floor or into an open box (as is often done) the whole mass would quickly be aflame, and with no means at hand to extinguish it the consequences would be fearful to contemplate.

The cry of fire at night or day heard at any place is

startling, but when uttered in a crowded theatre, concert hall, fair or bazaar, it is simply appalling. Nowhere else except on board a ship in mid-ocean does it strike such terror to the human heart. Nowhere else does it cause strong men to forget the nobler instincts born or cultivated within them. Nowhere else do they so quickly descend to the level of the brute in their mad rush from impending danger, trampling under foot their weaker brother, their still weaker sister and her helpless children. Nowhere else do they so quickly forget the chivalrous instincts that prompt them to protect and defend those they have thrust aside and left to a horrible fate. Yet, when we remember the many instances where places of public amusement were turned into charnel houses, and where joyous laughter was quickly turned into shouts of horror and cries of agony, by the cry of fire alone, where such a cry was either needless or heartless, can we wonder at this sudden change in man's nature? I am inclined to think not. With the terrible examples of the past, and the possibilities of the future before us it is the duty of every fire chief to see that every precaution that human forethought can devise should be taken to prevent fire, no matter how incipient, in any place of public amusement.

Is the exhibition of animated photography attended by dangers that cannot be entirely removed or prevented? I say most emphatically: No, it is not. A few simple rules rigidly adhered to, and the necessary amount of care and intelligence on the part of the operator will prevent all accidental fires from this cause.

The operator should thoroughly understand all the mechanism, know just where the possible danger is, and be ever ready to quickly remove or prevent it. No boy without any sense of responsibility; no drunkard, or one addicted to over-indulgence in strong drink; and no careless lout, with no aim or purpose other than to do as little as possible during his waking hours, should be placed in charge of this apparatus. While the very highest order of intelligence may not be necessary in the operators, they should belong to a class above the ordinary; this is absolutely necessary where so much depends on their individual care and effort.

If an arc lamp is used it should be enclosed in a metal or metal-lined box. As a matter of fact this is done in all first-class machines. If it is in an open room, a large metal pan containing sand should be placed under it. The frame for the lens should be of metal. A shutter should be provided between lens and film, cutting off light from the same when its movement is interrupted by accident or otherwise; it should close automatically and be held open by the foot of the operator when the film is in motion, or a glass vessel filled with a solution of alum water should be placed between the lens and the film. This last precaution should be taken in all cases where films less than the standard width are used. Films should be wound and unwound on metal reels which should be kept in metal cases.

Films not in use should be kept in metal boxes provided with self-closing covers kept securely closed except when it is necessary to remove or replace them. The lamps, reels, films, belts and pulleys should be contained in a cabinet of metal, or wood, metal-lined, the working side to have a door that could be instantly shut in case of accident. The motor controlling rheostat, switch and fuse-block should be outside this cabinet. The resistance coils should be largely in excess of the current capacity of the motor, so as to prevent excessive heating, and the electric wiring and fixtures should be done in accordance with the national code. The electric light is preferable to calcium or acetylene gas light, for the former requires neither match nor flame to light it. With these necessary precautions, exhibitions of animated photography can be given without increasing the fire hazard or endangering the lives of the audiences.

A MODEL FIRE ALARM CENTRAL OFFICE.

The finest and most complete fire alarm central office in the United States is now in the course of construction at Washington, D. C., by the Gamewell Fire Alarm Telegraph Company, of New York. It is stated that neither labor nor expense will be spared in this plant, and although the Gamewell company have installed many complete central stations throughout the country, they propose that this Washington installation shall be superior to any yet furnished. It will include a complete storage battery system. The woodwork will be of polished mahogany, artistic in design and elaborately carved.

PROPOSALS FOR LIGHTING.

Henry C. Kramer, city clerk of Camden, N. J., advertises in this issue of CITY GOVERNMENT for proposals for lighting the streets of Camden with incandescent and arc electric lights for terms of one, three and five years, beginning July 1, 1899. Bids will be received until November 16, 1898; specifications being on file at the city clerk's office in Camden.

THE LA FRANCE NEW STYLE ENGINE.

The La France new-style piston steam fire engine has been on the market for about five years, and all the claims of superiority made by its inventor for the pumps and boiler have been fully sustained. It has met with the greatest possible success in the numerous cities where it has been put in service, and city officials contemplating the purchase of the new engines should not fail to examine and consider the merits of the new La France machine. A handsome catalogue, fully describing the new engine, will be furnished free by the La France Fire Engine Company, Elmira, N. Y.

NEW PICK-UP STREET SWEEPER.

A new pick-up street sweeper was exhibited on the streets of the Borough of Brooklyn, New York city, Friday afternoon, October 21, and the verdict of all who witnessed its operation is to the effect that it is a perfect machine. As this form of CITY GOVERNMENT goes to press immediately after the exhibition, a full description of the new sweeper and its method of operation must be deferred until next month. The sweeper in question is to be manufactured and put on the market by the Charlton Manufacturing Company, of Brooklyn, N. Y. One of the sweepers has already been ordered for use in the Capitol grounds at Washington, D. C., and it may be in that city in time to exhibit it on the streets for the inspection of the numerous city engineers who will be at the nation's capital next week in attendance upon the convention of the American Society of Municipal Improvements.

MISCELLANEOUS ITEMS.

—The common council of Rochester, N. Y., have decided to add twenty-five patrolmen to the present police force and to have eighty-five men on duty every night, instead of fifty as at present.

—Chief of Police Frank Demmer, of Aurora, Ill., has resigned and is an unopposed candidate for sheriff of Kane County. He has been succeeded as chief of police by Frank Michaels, his efficient captain.

—The council of Syracuse, N. Y., have decided to experiment with voting by machinery. The machine selected for the trial is the United States, manufactured by the United States Voting Machine Company, of Jamestown, N. Y., and ten of them will be used at the November election in Syracuse.

NEW YORK ASPHALT SENSATION EXPLODED.

A False and Misleading Official Report Corrected and Sensational Newspaper Stories Exposed.

A STATEMENT OF THE COMMISSIONERS.

We will simply refer to the practice of letting asphalt contracts in the past to a favorite few by imposing such restrictions into the specifications which make it impossible for others than those connected with the asphalt combine to comply with, and which we believe no one, unless they were pecuniarily interested, would allow to exist in any legitimate business.

We have collected such evidence as will, we believe, clearly show that New York city has been paying in the past three years about $1 per square yard more than the same companies charged for the same work for the same number of years' maintenance in several large adjacent cities.

That there exists a combine we believe we show beyond a doubt from the information we have obtained, as the entire work given out in this city, as well as in all neighboring cities, has been controlled by practically one company.—REPORT OF THE COMMISSIONERS OF ACCOUNTS INVESTIGATING THE REFORM DEPARTMENT OF PUBLIC WORKS.

A STATEMENT OF THE FACTS.

The specifications for asphalt paving in New York city during the administration of the "Reform Department of Public Works" and at the present time contain this clause: "The asphaltum used must be equal in quality to that mined from the pitch lake on the Island of Trinidad or from the Alcatraz Mine, Santa Barbara County, California." Under these specifications Trinidad Lake, Trinidad Land, Alcatraz and Rock asphalts are and have been admitted.

No evidence has been nor can be produced to show that New York city has been paying in the past three years about $1 per square yard more than the same companies charged for the same work for the same number of years' maintenance in several large adjacent cities. New York is the only city that exacts a 15-year guarantee.

There has been keen competition for asphalt paving contracts in New York city between seven distinct companies.

The object of the present agitation on the subject of asphalt paving prices in New York is scarcely discoverable. The agitation began with the investigation which Mayor Van Wyck directed the commissioners of accounts to make of the records and methods of the department of public works of the preceding administration. The report of this investigation, as submitted by the commissioners, conveyed the charges that New York had been paying in the last three years $1 more per square yard for asphalt paving than had been charged by the same contractors under the same guarantee in several adjacent cities; that an asphalt combine existed, and that the specifications in New York imposed restrictions that made it impossible for any outside contractor to compete with the alleged combine.

These sensational charges were eagerly taken up by the always sensational daily press of New York, and the story that the city was being "fleeced by an asphalt ring" was given the greatest possible publicity. The commissioners of accounts, as far as can be learned, have no foundation whatever for the grave charges made in their report. They have submitted no evidence to prove the truth of their statements. The New York *Herald*, in an endeavor to substantiate the sensational report of the commissioners, gave up column after column of its valuable space for the publication of misleading statements and unjust comparisons of the prices paid for asphalt paving in a number of large cities with those paid in New York.

As stated at the beginning of this article, the object of all this agitation is scarcely discoverable. The course the New York dailies have pursued in the matter is explained by their readiness at all times to publish anything of a sensational nature, regardless of the truth. But why the commissioners of accounts, representing the present municipal administration, should give out a report containing unfounded charges against a former administration, and why Mayor Van Wyck should mention such horrid things as "the gates of the penitentiary," in commenting upon this absurd report are things beyond understanding. It should not be asserted that the report and the mayor's comment on it were given out for political effect in the pending campaign, because Tammany Hall is not much given to the boomerang method of campaigning. Without assigning any object for the proceeding, it may be safely stated that the commissioners of accounts have committed a serious blunder, and the mayor, being pressed with matters of more importance, has commented on their work without fully understanding it.

The commissioners of accounts were in error when they reported "that New York city has been paying in the past three years about $1 per square yard more than the same companies charged for the same work for the same number of years' maintenance in several large adjacent cities." The "several large adjacent cities" must necessarily be Brooklyn, Jersey City and Hoboken. The difference of about $1 per square yard might be shown by comparing the price paid for a complete asphalt pavement in New York with the price paid for laying merely a wearing surface of asphalt over an old cobble pavement in Brooklyn. Certainly it cannot be shown in any other way. Neither Brooklyn, Jersey City nor Hoboken requires the fifteen-year guarantee exacted by New York. The cost of maintaining an asphalt pavement in any of these three adjacent cities compares with the cost of the same work in New York as a tallow candle compares with an arc electric light. Prices for asphalt paving in Jersey City and Hoboken during 1895-7 were notoriously high, while the prices in Brooklyn during that period were considered very low. If any one of these adjacent cities beat New York by $1 a square yard on asphalt paving during the past three years it must have been Brooklyn. Here are the actual average prices paid for "the same work for the same number of years' maintenance" in New York and Brooklyn for the past three years:

	Brooklyn.			New York.
	Av. Contract Price, 5-Year Guarantee.	Maintenance to 15 Years.	Cost of 15-year Pavement.	Av. Contract Price, 15-Year Guarantee.
1895	$1.99	$1.00	$2.99	$3.35
1896	1.80	1.00	2.80	2.75
1897	1.77	1.00	2.77	3.16

Where is the difference of $1 a square yard? In 1895 New York paid, on an average, just 36 cents more per square yard for a 15-year pavement than Brooklyn paid; in 1896 the average New York price was 5 cents less than the Brooklyn figure, and in 1897 it was 39 cents more. The difference in the cost of maintenance in the two cities explains why the New York price should be the higher. The maximum difference in prices is 39 cents, and it occurs in 1897, when most of the paving in New York was laid on extremely heavy traffic streets. N. P. Lewis, engineer of highways, Brooklyn, says that 10 cents per square yard is a reasonable allowance for maintenance or repairs in Brooklyn. This being the case, 13 cents must be a reasonable figure for maintenance and repairs on the very heavy traffic streets of New York. This additional 3 cents for maintenance in New York amounts to 45 cents on a 15-year pavement, while the additional average maximum cost of the work in New York over Brooklyn is but 39 cents. The records of the department of public works of New York show that maintenance on such streets as Liberty, William, Cedar and New actually costs 13 cents per square yard per year, while maintenance on such lighter traffic streets as 96th, 103d, 106th and Madison avenue actually costs 12 cents per square yard per year.

The commissioners of accounts committed a serious error when they stated "That there exists a combine, as the entire work given out in this city, *as well as in all neighboring cities*, has been controlled by practically one company." Asphalt work has been given out in New York during the past few years to:

Barber Asphalt Paving Co.
Warren-Scharf Asphalt Paving Co.
Sicilian Asphalt Paving Co.
Atlantic Alcatraz Asphalt Co.
Fruin-Bambrick Construction Co.
Asphalt Construction Co.
Metropolitan Asphalt Paving Co.

These companies use practically all of the different asphalts that have been admitted to competition in any city. Most of them have been fighting each other tooth and nail throughout the country, in many places cutting prices to a losing figure. There is not a scintilla of evidence that they have formed a "combine" in New York city. Here are the average prices paid for asphalt paving in New York since 1890:

FIFTEEN-YEAR GUARANTEE.

1890	$4.01	1895	$3.35
1891	3.88	1896	2.75
1892	3.93	1897	3.16
1893	3.84	1898	2.73
1894	3.85		

The above table shows that the drop in asphalt prices occurred in 1895, and that since then the prices have remained at a low figure. It was in 1895—acording to official records that cannot be disputed—that the specifications were amended so as to enlarge the field of competition for contracts. Prior to 1895 there might have been a combine; since then there has certainly been competition to bring down the prices. If a combine was formed in 1895 and exists to-day, what can be its object? Is it reasonable to presume that the companies are in collusion for the purpose of reducing and holding down prices and curtailing their own profits?

In order to make their blunder absolutely absurd the commissioners of accounts stated that "the entire asphalt work given out *in all neighboring cities* has been controlled by practically one company." The commissioners were probably not aware of the fact that in the neighboring city of Newark the Barber and Alcatraz companies cut and slashed at each other until they beat down the price of a complete and first-class asphalt pavement to $1.39 per square yard—a figure that means certain loss to the contractor. And is it possible that such close investigators as the commissioners never heard of the long continued and extremely bitter fight between the Barber and Alcatraz companies in the neighboring cities of Philadelphia, Syracuse, Binghamton, Camden, Scranton and Utica?

The commissioners of accounts erred again when they reported that the asphalt specifications in New York contained restrictions which made competition impossible. Such has positively not been the case since 1895—the period covered by their alleged investigation. The New York specifications read: "The asphaltum used must be equal in quality to that mined from the pitch lake on the Island of Trinidad or from the Alcatraz mine, Santa Barbara County, Cal." No city in this country has specifications admitting a wider competition than is admitted by the New York specifications.

Now for a comparative table, such as might have been produced by the New York *Herald* had it desired to spoil a sensation by being fair:

City.	Guarantee. Years.	Lowest Price Per Square Yd. 1897.	Maintenance to 15 Yrs.	Cost of 15-Year Pavement.
Buffalo, N. Y.	5	$2.53	$1.00	$3.53
Cincinnati, Ohio	5	2.35	1.00	3.35
Cleveland, Ohio	10	2.55	.50	3.05
Hartford, Conn.	5	2.59	1.00	3.59
New Orleans, La.	5	2.80	1.00	3.80
Philadelphia, Pa.	5	2.05	1.00	3.05
Providence, R. I.	5	2.45	1.00	3.45
Springfield, Mass.	10	3.07	.50	3.57
Scranton, Pa.	5	1.95	1.00	2.95
Baltimore, Md.	5	2.25	1.00	3.25
New York City	15	2.87		2.87
Average cost of 15-year pavement, 11 cities				$3.31
New York City price *below* average				.44

The *Herald*, in order to be thoroughly misleading, has published some of the extremely low prices that have been obtained in 1898. In the above table the lowest prices of 1897, which were obtained under normal conditions, are given. Here is another table, presenting extremely low bids on asphalt work made this year:

City.	Guarantee. Years.	Lowest Bid of 1898.	Maintenance to 15 Yrs.	Cost of 15-Year Pavement.
Cleveland, Ohio	10	$1.70	$0.50	$2.20
Pittsburg, Pa.	5	1.70	1.00	2.70
Louisville, Ky.	5	1.70	1.00	2.70
Newark, N. J.	5	1.39	1.00	2.39
Philadelphia, Pa.	5	1.21	1.00	2.21
Milwaukee, Wis.	5	1.95	1.00	2.95
Washington, D. C.	5	1.80	1.00	2.80
New York City	15	2.73		2.73
Average cost of 15-year pavement, 8 cities				$2.58
New York City price above average				.15

The price of $2.73 given above for New York is on a contract let this year to the Atlantic Alcatraz Asphalt Co. The other figures given are the lowest bids secured in the cities designated in 1898. Ten cents yer square yard per year is allowed for maintenance after the expiration of the guarantees. That this is a fair allowance will be conceded by all competent engineers. The Cleveland, Newark and Philadelphia prices on a 15-year pavement are considerably lower than New York; Pittsburg and Louisville are about the same, and Milwaukee and Washington are higher. In Cleveland, Newark and Philadelphia the extremely low prices resulted from a fight on the part of the Alcatraz people to introduce their material in those cities, and the contracts were taken at losing figures. The prices in every city represented in the table have been re-

duced from those of the preceding year by competition. The New York figure would compare favorably with the average were it not for the fact that the losing prices of Cleveland, Newark and Philadelphia depress the average. Therefore, it is unnecessary to justify the New York price with certain considerations that ought to be taken into account. For instance, in comparing the asphalt paving prices of New York with those of other cities, such items as heavier traffic, higher yard rent, higher taxes, higher wages, more stringent rules as to maintenance and repairs, etc., must be regarded as of importance.

MUNICIPAL ELECTRIC LIGHT STATISTICS.

In the years 1896 and 1897 the question of building a municipal electric light plant was under discussion by citizens and officials of Jackson, Mich. The accompanying statistics were collected and tabulated by Alderman Wesley Sears, of that city, for the sole purpose of ascertaining whether Jackson was paying a large price for its arc street lights, as compared with the cost of arc lights produced by municipal lighting plants taken at random throughout the country.

There was no design on the part of the author of these tables to raise the general question of the comparative cost of arc street lights by contract and by municipal plants, but only to ascertain whether the contract price that Jackson was *then* paying ($70 per year per light—2,000 candle-power—3,800 hours per year) was exorbitant, or, to put it differently, whether it would pay the city of Jackson, Mich., in the face of such a contract, to establish an electric light plant of its own.

The author did not know what kind of a showing any or all of the cities with which he entered into correspondence would make. He selected at random the cities in which he had been informed there were or had been municipal light plants, but found, in some cases, that the cities were lighted by private contract, that others had sold their plants, and that still others, after repeated inquiries, would furnish no figures at all. The statistics of some cities are incomplete, but all the figures gathered, except minor details, are herewith presented.

In tables "A" and "B" a uniform five per cent. for depreciation on total cost of the plant, and four per cent. for interest on the invested capital is figured—these two items being placed together as a nine per cent. item in the first two tables. In table "C" a somewhat different method is pursued because of the way the information of that year is tabulated by the Gas and Light Commissioners of Massachusetts.

This item of depreciation and interest is the only one concerning which much question can be raised, and it is undoubtedly susceptible to considerable discussion, both pro and con. It is not the author's intention to discuss here the correctness of this or any other item of these tables.

No allowance is made in any of these tables for insurance, loss of taxes, or possible costs to the municipality for damages arising from the conduct of public utilities. In isolated cases, insurance or taxes, or both, are included in the figures furnished, and attention is called to these cases in the notes following.

If any plant is doing a commercial or domestic business, or if it is furnishing lights to public buildings, credit is given the plant for the full value of these lights before any net or average cost is found for arc lights. The reader will please bear in mind always that the author has endeavored to ascertain the *net cost* of an *arc street light*, as Jackson has never seriously contemplated going into the commercial lighting business.

In compiling these statistics it was early learned that in order to get at any figures for close comparison some basis other than "cost per lamp per year" must be used. "All night" schedules, "Moonlight" schedules, "Philadelphia Moonlight" schedules, etc., had practically no uniform meaning. It has, therefore, been the constant aim of the author in every instance, if possible, to secure the number of hours the lights burned per year, and so reduce the basis for comparison to the "cost per lamp per hour burned." This avoids all scientific terms, such as "kilowatts," "volts," etc., and reduces the cost to a practical point where the average mind can comprehend it. More difficulty has been experienced in securing exact data for column 16 than for nearly all other items. This accounts for so many "estimates" and blanks in column 16.

An interrogation point (?) after any number indicates that the number is an estimate.

A blank space indicates that the information for that space was not furnished, though the blank spaces in column 12, table "A," and those of column 10, table "B," indicate that the item is zero.

NOTES ON TABLE "A."

These statistics were obtained mostly by correspondence during the months of February and March, 1898. All lights in this table are nominally 2,000 cp. unless otherwise stated in the notes. All expressions inclosed in quotation marks ("-") are verbatim statements taken from reports of correspondents.

Alameda, Cal.—Figures partly from correspondence and partly from printed report of city clerk and expert accountant. Some incandescent lights are furnished to city buildings, but the $7,000 (column 12) allowed for income from incandescents is a larger amount than named in any report received.

Allegheny, Pa.—Accounts of arc and incandescent systems kept separate. Figures here given include those relative to arc system only, except in columns 4 and 5, where cost of both systems is included. Insurance on plant is included in item in column 9. "You may also add $5 per lamp for excess cost of coal in your city. After enumerating all of above charges, your lamps should not cost more than $75 per annum."

Ashtabula, Ohio.—Figures incomplete. Officials failed to respond to repeated inquiries. They run on moon schedule to 3 A. M.

Aurora, Ill.—"Our citizens are thoroughly convinced that municipal management of street lighting is the most economical and satisfactory."

Bangor, Me.—The statement has been widely circulated by the press that Bangor was producing all night arc lights for $35 per year, interest and depreciation being allowed. The author of these tables wrote repeatedly to the Bangor city officials earnestly soliciting the information as to how they produced their light so cheap. They have paid no attention to the request, though a stamped, addressed return envelope was sent them in each instance.

Batavia, N. Y.— Plant run in connection with water works. Salary schedule of electric light plant is as follows: Superintendent, $75 per month; trimmer, $45 per month; one fireman, $45 per month; total salary schedule per month, $165. All other salaries of both water plant and light plant are charged to the water works system. Item in column 9 includes $128.16 for insurance. The electric light report for year ending August 31, 1896, has an item of $1,169.96, and the report for year ending August 31, 1897, has an item of $674.32 for "construction, new work, incandescent lamps, wire, labor, supplies for Ellicott Square hose house, new arc lamps, care of fire alarm system, and not chargeable to cost of running electric light station." These two items are entirely dropped out of calculation when averaging the cost of lights, and have, therefore, been entirely omitted from this table. "Superintendent takes care of our fire alarm system in connection with his other work. We formerly paid $12 per month to take care of the system."

Bay City, Mich.—Two reports. Report "A" from correspondent. Report "B" from printed report. Items are

STATISTICS ON MUNICIPAL ELECTRIC LIGHTING.

[TABLE A.] COMPILED AND TABULATED BY ALDERMAN WESLEY SEARS, JACKSON, MICH.

Place.	Population in Round Numbers.	Plant when Installed.	Original Cost of Plant.	Cost of Later Extensions and Improvements.	Total Cost of Plant to Date.	Total Capacity of Plant. Arcs.	Total Capacity of Plant. Incandescents.	Cost of Operating and Maintenance for Year.	Depreciation and Interest. (5+4=9 per cent.)	Total Cost of Operating and Maintenance, Including Depreciation and Interest.	Total Income from Commercial Lighting.	Net Cost of Operating and Maintenance for Arc Lighting, Including Depreciation and Interest.	No. of Arc Lights Furnished.	Average Yearly Cost per Light.	No. of Hours Lights Burn Yearly.	Cost in Cents per Light per Hour.	Cost of Coal per Ton.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Alameda, Cal.	15,000	1893	$54,900	$46,635	$101,535	100	5,500	$10,951	$9,138	$20,089	$7,000 ?	$13,089	103	$127.08	...	....	....
Allegheny, Pa	115,000	1890	160,000*a*	195,000*a*	265,000*b*	....	....	54,908*b*	23,850*b*	78,758*b*	....	78,758*b*	1,100	71.60	4,050	1.77	$1.00
Ashtabula, Ohio *c*	13,000	1892	25,000	55,000	80,000	....	....	11,736	7,200	18,936	....		88		....	....	1.65
Aurora, Ill.	26,000	1887	17,986	33,474	51,460	...	...	10,302	4,631	14,933	....	14,933	206	72.49	2,555	2.84	....
Bangor, Me.	22,000						*See*	*Note*									
Batavia, N. Y.	8,500	1894	23,000		23,000	120	....	4,517	2,070	6,587	....	6,587	103	63 95	3,404	1.88	1.92
"A," Bay City, Mich.	35,000	1887	30,000	18,000	48,000	310	....	8,849	4,320	13,169	....	13,169	220	59.86	2,700	2.22	1.75
"B," Bay City, Mich.	35,000	1887	30,000	18,000	48,000	310	....	8,849	4,320	13,169	....	13,169	209	63.01	2,623	2.40	1.75
Bloomington, Ill.	20,000	1889	73,000	10,000	83,000	300	....	15,573	7,470	23,043	....	23,043	310	74.33	2,712	2.74	1.65
Brainerd, Minn.	8,500	....	40,000	20,000	60,000	....	....	5,400	5,400	10,800	9,000 ?	1,800	36	50.00	....	....	*d*
Crawfordsville, Ind	10,000						*See*	*Note*									
"A" Detroit, Mich.	300,000	1895	.....	.....	617,594	2,000	....	100,393	55,583	155,976	....	155,976	1,564	99.73	3,791	2.60	....
"B," Detroit, Mich.	300,000	1895	.....	.....	706,452	..	....	90,440	63,581	154,021	....	154,021	1,744	88.31	3,786	2.33	....
Dunkirk, N. Y.	12,000	1889	10,000	11,000	21,000	90	....	2,967	1,890	4,857	72	4,785	75	63.80	3,134	2.04	....
Easton, Pa.	20,000	1886	19,000	23,500	42,500	180	...	11,391	3,825	15,216	....	15,216	147	103.51	3,831	2.70	3.00
Elgin, Ill.	23,000	1889	17,000	10,000	27,000	240	....	12,620?	2,430	15,050	43	15,007	191	78.58	3,800?	2.07	2.00
Goshen, Ind.	8,000	1889	9,000	15,000	24,000	....	....	3,872	2,160	6,032	....	6,032	125	48.26	2,400?	2.01	2.16
Hamilton, Ohio	20,000	1896	100,000	10,000	110,000	..	....	14,751	9,900	24,651	8,640	16,011	209	76 61	3,700	2.07	1.70
Hannibal, Mo.	15,000	1886	20,000	30,500	50,500	150	3,500	11,571	4,545	16,116	11,450?	4,666	87	53.63	3,000?	1.79	1.40
Holland, Mich	8,000	1894	12,000	23,000	35,000	00	2,300	9,500	3,150	12,650	7,415	5,235	59	88.73	2,500?	3.55	2.50
Jackson, Mich	30,000					*Lighte*	*d by priv*	*ate contr*	*act.*	*See*	*Note.*		238	67.65	3 800	1.78	1.75
"A," Jamestown, N. Y.	23,000	1889	32,000	30,000	62,000	....	...	14,512	5,580	20,092	5,000?	15,092	283	53.33*e*	3,800	1.40	1.60
"B," Jamestown, N. Y.	23,000	1889	.....	.....	75,000?	....	....	18,111	6,750	24,861	6,000?	18,861	275	68.59*e*	3,800	1.81	1.60
Kalamazoo, Mich.	20,000	1896	42,060	.....	42,060	...	....	12,873	3,785	16,658	.	16,658	200	83.29	3,036	2.74	2.45
Lansing, Mich	18,000						*See*	*Note*									
Lewiston, Me.	23,000	1887	14,000	6,000	20,000	150	....	8,000	1,800	9,800	....	9,800	157	62.42	....	....	....
Little Rock, Ark.	35,000		35,000	1,400	36,400	..	....	8,753	3,276	12,029	....	12,029	212	56.74	2,453	2.31	*d*
Logansport, Ind.	22,000	1895	56,000	34,000	90,000	460	10,000	12,973	8,100	21,073	17,965	3,107	160	19.42	2,100?	.92	....
Macon, Mo.	5,000	1890	35,000*g*	10,000*g*	45,000*g*	50	1,200	5,000*g*	4,050*g*	9,050*g*	5,024*g*	4,026*g*	41	98.20	2,100?	4.68	*f*
Marietta, Ohio	12,000	1889	18,000	500	18,500	....	..	4,442	1,665	6,107	725	5,382	112	48.05	2,400?	2.	1.25
Marshalltown, Ia.	11,000	1887	12,000	5,000	17,000	...	...	1,670	1,530	3,200	....	3,200	98	32.65*e*	1,956	1 67	*h*
Michigan City, Ind.	11,000						*See*	*Note*									1.25
Moline, Ill.	18,000	1888					*See*	*Note*									
Muncie, Ind.	25,000	1891	22,000	7,000	29,000	150	....	4,345	2,610	6,955	....	6,955	149	46.68	2,823	1.65	*h*
Newark, Ohio.	17,000	1894	40,000	4,000	44,000	....	....	7,324	3,960	11,284	....	11,284	200	56.42	3,800	1.71	.90
Springfield, Ill.	42,000	1895	100,000	1,100	101,100				*See*	*Note*			386				
St. Joseph, Mo.	65,000	1880	60,000	30,000	90,000	400	....	23,104	8,100	31,204	....	31,204	365	85.49	2,080	3.05	1.05
Topeka, Kan.	40,000	1889	46,888	13,772	60,660	....	....	10,363	5,459	15,822	....	15,822	258	61.33	. .	....	2.00
Wheeling, W. Va.	40,000	1892	125,000	9,000	134,000	540	.	21,000	12,060	33,060	....	33,060	470	70.34	3,800?	1.85	.93
Xenia, Ohio.	10,000	1885					*See*	*Note*									
Ypsilanti, Mich.	7,000	1886	.....	.....	15,000	....	....	3,000	1,350	4,350	....	4,350	90	48.33	2,000?	2.42	....

REFERENCES.—*a*—Both arc and incandescent systems included. *b*—Arc system only. *c*—Incandescent system. *d*—Water power. *e*—Lamps 1,200 c. p. *f*—Water and steam power; natural gas fuel. *g*—Both water and light plants included. *h*—Natural gas fuel.

[TABLE B.]

STATISTICS ON MUNICIPAL ELECTRIC ARC LIGHTING, CITIES OF MASSACHUSETTS, FOR YEAR ENDING JUNE 30, 1896.

PLACE.	Population in Round Numbers.	Plant When Installed.	Total Cost of Plant To Date.	TOTAL CAPACITY OF PLANT.		Cost of Operating and Maintenance for the Year.	Depreciation and Interest (5+4=9 Per Cent.).	Total Cost of Operating and Maintenance, Including Depreciation and Interest	Total Income from Commercial and Domestic Lighting.	Net Cost of Operating and Maintenance for Arc Lighting, including Depreciation and Interest.	No. of Arc Lights Furnished.	Average Yearly Cost Per Light.	No. of Hours Lights Burn Yearly.	Cost in Cents per Light per Hour.	Nominal Candle Power of Arc Lights Furnished.
				Arcs.	Incandescents.										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Braintree	5,500	1892	$57,829	150	1,600	$9,829	$5,205	$15,034	$4,934	$10,100	91	$110.99	2,541	4.37	1,200
Danvers	8,500	1889	16,562	90		3,508	1,491	4,999	....	4,999	81	61.72	1,778	3 47	1,200
Marblehead	8,000	1895	77,094	200	1,200	9,276	6,938	16,214	3,212	1,8002	151	86.11	3,0 8	2.84	1,200 and 2,000
Middleborough	7,000	1893	61,355	135	2,650	8,292	5,522	13,814	5,065	8,749	105	8 .32	2,469	3 :7	1,200
Peabody	11,000	1892	66,374	192	2,000	11,009	5,974	16,983	3,658	13,325	161	82.76	3,648	2.27	1,200
Reading	5,000	1895	63,187	150	1,350	8,531	5,687	14,218	1,193	13,025	112	116.29	1,909	6.09	1,200
Wakefield	8,500	1894	78,041	145	1,650	11,863	7,024	18,887	4,812	14,075	145	97.07	1,404	6.91	1,200

[TABLE C.]

STATISTICS ON MUNICIPAL ELECTRIC ARC LIGHTING, CITIES OF MASSACHUSETTS, FOR YEAR ENDING JUNE 30, 1897.

PLACE.	Population in Round Numbers.	Plant when Installed.	Total Cost of Plant to Date.	TOTAL CAPACITY OF PLANT.		"Net Loss in Operating," and "Other Cost Items."	Interest.	Depreciation.	Total of Columns 7, 8 and 9, or Net Cost of Operating with Interest and Depreciation.	Actual Net Cost of all Arc Lights.	Number of Arc Lights Furnished.	Average Yearly Cost per Light.	No. of Hours Lights Burn Yearly.	Cost in Cents per Light per Hour.	Nominal Candle Power of Arc Lights Furnished.
				Arcs.	Incandescents.										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Braintree	5,500	1892	$60,458	150	4,100	$5,225	$1,617	$2,846	$9,688	$7,472	91	$82.11	2,654	3.09	1,200
Chicopee	16,500	1896	89,500	200	1,800	8,422	3,400	4,515	16,337	16,337	125	130.69	2,721	4.80	1,200
Danvers	8,500	1889	35,126	135	1,200	4,294	608	1,392	6,294	6,294	85	74 05	1,800	4.11	1,200
Hudson	5,500	1897	22,835	45	650	767	360	521	1,648	1,568	14	112.00	1,722	6.50	1,200
Marblehead	8,000	1895	81,017	200	2,700	6,268 and 177	2,320	4,131	12,836	10,769	151	71.32	3,129	2.28	1,200
Middleborough	7,000	1893	103,108*	135	2,650	2,715 and 408	1,993	2,164	7,280	7,148	95	75.24	2,250	3.34	1,200
Peabody	11,000	1892	72,066	240	2,000	7,454 and 400	2,010	3,537	13,401	12,331	157	78.54	3,757	2.09	1,200
Reading	5,000	1895	67,500	150	1,350	5,986	2,370	3,205	11,561	11,561	123	93.99	1,498	6.27	1,200
Wakefield	8,500	1894	179,000*	145	1,650	7,405 and 214	3,006	3,347	13,972	13,972	144	97.03	1,382	7.02	1,200

* Gas and electricity combined.

same in both reports, except in columns 14, 15, 16 and 17 "Rented lights should cost you not less than $85 per year."

Bloomington, Ill.—"We run the plant in connection with the water works, and keep all accounts between the departments separate. We figure no depreciation, for the reason that we keep our machinery in good shape, and after running nine years get as good results as we did when we first started; neither do we figure interest, as we consider the plant a permanent investment just the same as we do street pavement."

Brainerd, Minn.—Statistics incomplete. Plant run by water power. In 1895 the people voted to sell the plant because "the ownership of the plant by the city has not proven profitable." "But the purchase price was never paid up, so the deal is off."

Crawfordsville, Ind.—The following is the only reply received to letter of inquiry: "We do own our light; but if we did not, we would not, for in my opinion it will bankrupt any city."

Detroit, Mich.—Two reports, one designated as "A," for the year ending June 30, 1897, and the other designated as "B," for the year ending June 30, 1898. Each report is for arc lighting only. In neither of these reports are taxes considered, though the Electric Lighting Commission of Detroit includes $5.10 per arc light for taxes in their report for 1897, and $4.80 per arc light for taxes in their report for 1898. In their report for 1897 the commission includes depreciation on boilers only, amounting to $1.85 per arc light; while in their report for 1898 they include three per cent. on cost of plant for depreciation. Taking these items of taxes and depreciation as stated, together with operating expenses and four per cent. interest on investment, the lighting commission made the cost of an arc light for 1897, $89.42, and for 1898, $83.50. In the table herewith a uniform charge of five per cent. for depreciation and four per cent. for interest is made. Items in column 6 for Detroit are such a proportion of the total cost of the plant as the electrical output for arc lighting bears to the total electrical output of the plant for years named.

Dunkirk, N. Y.—Plant run in connection with water works. Salaries paid on account of electric lights are as follows: One trimmer, $660; firemen, extra pay, $120; total of all salaries paid to electric light employees, $780 per year. All other salaries of both water works and electric light plants are charged to the water works plant and amount to $4,280, as follows: Superintendent, $1,200; engineers and firemen, $2,880; secretary, $200.

Elgin, Ill.—Printed report gives "pay roll" (current expenses) of electric light department for one year $13,184, not $12,620 as stated by correspondent and as given in this tabulation. Salary of city electrician ($1,000) is not included in expenses of electric light department, but is charged to "General Department—Salaries." "We run our plant all night and every night in the year—only when the moon is full. We do not keep a record of number of hours, but the plant was run over 4,000 hours last year."

Goshen, Ind.—Plant run in connection with water works. One-half of expense of running both plants is chargeable to each. No account is kept of number of hours lights burn yearly. "We run when it is dark regardless of moon."

Hamilton, Ohio.—Figures partly estimated. Light plant run by Gas Trustees. "Council allows the Gas Trustees $75 per light per year for each arc lamp. The usual price for arc is about $100."

Hannibal, Mo.—Does commercial lighting. Figures partly estimated. City charges private parties $60 per year for 10 o'clock arc lights and $120 per year for all night arc lights. "Every street arc light burns every night in the year—all night—except when the moon shines bright enough to cast a shadow; we keep no account of the number of hours."

Holland, Mich.—Lights run dark nights to one o'clock A. M. Electric light and water works plants run together. Total operating expenses of both plants, $16,000; chargeable to water works, $6,500; to electric light plant, $9,500.

Jackson, Mich.—Lighted by private contract. Present contract made in May, 1898, is as follows: Number of lights to be furnished, 238, 2,000 c. p., to burn all night and every night, at least 3,800 hours per year; contract price, $16,100; average per light per year, $67.65. Cost per lamp per hour 1.78 cents. Rebates are allowed for "outages." Rebates from July 1, 1897, to July 1, 1898, amounted to $168.79, average rebate per light, 70 cents, making net cost per light, in round numbers, $67 per year; net cost per lamp per hour, 1.76 cents.

Jamestown, N. Y.—Two reports. "A" report from correspondent; "B" report from annual general statement of lighting plant. Figures differ quite materially. Arc lights, 1,200 candle power.

Kalamazoo, Mich.—"Last year was our banner year, with no accidents, and every man from superintendent down striving to make a record which you will see was made. Lights ought to cost Jackson $74 per year."

Lansing, Mich.—[Repeated inquiries of Lansing officials elicit no reply. Lansing is less than forty miles from Jackson, and the condition of lighting matters in that city is quite well known to many of Jackson's citizens. It is generally understood that Lansing's experience with municipal lighting is far from satisfactory.—Wesley Sears.]

Lewiston, Me.—Plant run by water power and in connection with water works. No report of the number of hours lights burn yearly.

Little Rock, Ark.—Item in column 9 includes $340 for insurance.

Logansport, Ind.—Large incandescent plant for commercial lighting. Income from commercial lights and other small items in 1897 was $17,965. They rate their arc lights worth $80 per light to the city, and in 1897 they gave their plant credit for $12,920 for "lighting streets," but this amount is not included in the $17,965 item in column 12. Plant is run partly by water power. Natural gas is used for fuel at five cents per 1,000 cubic feet. There is an item for "new construction" in 1896 amounting to $14,116, and in 1897 to $5,740. These items are not included in operating expenses, but are added to capital invested and included in column 6. "We burn by moonlight schedule and dark nights." "I suppose you do not pay less than $80 per year."

Macon, Mo.—Light and water plants run together. Accounts kept together. Could not get separate items. They figure arc lights worth about $75 per year. Lights run on "moonlight schedule."

Marietta, Ohio.—Plant run in connection with fire department and electric alarm system. Superintendent has other city affairs to look after; $480 of his total salary of $1,025 is charged to light plant. Natural gas is used for fuel at $75 per month. Lights run "every dark night except bright moon."

Marshalltown, Iowa.—Water works and electric light plants run together, but accounts kept separate. Lights are 1,200 candle power. Total salaries charged to light plant, $100 per month, as follows: $20 per month added to salary of engineer of water works; two firemen, $10 added to each per month; one lineman and trimmer, $60 per month.

Michigan City, Ind.—"The time our city owned the electric light plant it was run in connection with our water works. It was run very unsatisfactorily, and the plant had run down. Our council thought best to sell. We got $3,000 for same. Think original cost was $8,000. We are now paying $75 per year for 2,000 candle power lights run from dark until midnight. I believe if you are getting an all night light for $70 you have a very good contract."

Moline, Ill.—Moline established its light plant in 1888. Run in connection with water works for six years. Total cost, about $26,009, including addition to water works building. Sold electrical apparatus, fixtures, etc., in 1894

for $7,900. Now lighted by contract at $84 per year, lights to burn at all times when needed. "The prevailing idea here seems to be that it pays a municipal corporation to own its plant when the same can, as in our case, be run in connection with the city water works."

Muncie, Ind.— Natural gas for fuel. Gas wells owned by city, costing $6,000; one-half the cost is charged too electric light plant, and one-half to garbage plant. Fuel, therefore, costs nine per cent. of $3,000, or $270 per year. No fireman necessary. Total monthly salaries of plant, $235.

Newark, Ohio.—Coal costs ninety cents per ton.

Peoria, Ill.—"The electric lighting of the city is done by a private corporation to whom the city pays $97.50 per year per arc light of 2,000 candle power, the same to burn all night and every night in the year."

Portsmouth, Ohio.—The city operated its own plant for about seven years, and still owns it, but it is now operated by a private company. City pays the private company $50 per year per arc light, burning every night until midnight. "We believe we are merely keeping even in the operation of this plant at this figure. We are convinced it costs us about $50 per year per lamp."

Rockford, Ill.—City owns its own pole line, valued at $22,000. City lighted by private contract at $52 per light. Plant run partly by water power, effecting a saving of $10 per light per year over steam power. Add to these two items $5.47 per light for interest and depreciation on $22,000 (nine per cent. of $22,000 is $1,960,—for 362 lights—average $5.47 per light) and the total cost per light is $67.47 for every night and all night service. Four thousand hours, cost per lamp per hour, 1.69 cents.

Springfield, Ill.—City built a new plant in 1895, the money to construct it being furnished to the city by four banks. The plant is run by lessees as managers. City pays $112 per light per year on the "Philadelphia Moonlight" schedule. The difference between $112 per light and the actual cost of operating and maintenance is to apply on the purchase of the plant by the city. "Our lights cost us net about $43 per arc light."

Topeka, Kan.—Item in column 9 includes $282 for insurance. Report does not state number of hours lamps burn per year.

Wheeling, W. Va.—Plant run in connection with gas works. Lights burn from "dark to daylight." Coal 93¾ cents per ton.

Xenia, Ohio.—City installed a municipal lighting plant in 1885 and operated it for eleven years. Cost the city $21,000, and sold it for $10,000. Reason it was sold, it was too expensive. Under city ownership lights cost $95 per lamp per year for all dark hours. Present contract is $53.80 per lamp for all dark hours.

Ypsilanti, Mich.—Plant run in connection with water works, and both plants run mostly by water power. The item in column 6 does not include any part of the cost of the water power.

NOTES ON TABLE "B."

Statistics in this table are all official. All cities of Massachusetts having conducted a municipal arc lighting business for one year or more previous to June 30, 1896, are included in this table. Candle power of all lights, 1,200, except in case of Marblehead. Marblehead runs her lights at 2,000 candle power until 10 P. M., then following at 1,200 candle-power.

NOTES ON TABLE "C."

Statistics in this table are all official. All cities of Massachusetts having conducted a municipal arc lighting business for five months or more previous to June 30, 1897, are included in this table. Candle power of all lights reduced to a 1,200 candle-power basis.

For the reason that the commissioners, in their report of this year, do not tabulate their statistics uniformly with the previous year, the method of obtaining averages for this table varies somewhat from that of tables "A" and "B."

Figures in columns 7, 8, 9, 10, 12 and 13 are taken directly from the commissioners' report, though figures in columns 7, 8, 9 and 10 are not used at all to obtain the averages in this table; the latter statistics (columns 7, 8, 9 and 10) being introduced here to show the method of presenting certain facts.

In column 7, the larger number, if there are two numbers, and the single number, if there is but one, is uniformly "net loss in operating," which the report says is the "difference between the operating expenses and the income from commercial and domestic lighting."

It will be observed that in columns 8 and 9 the amount charged for interest is uniformly less than four per cent. on cost of plant to date, and the amount charged for depreciation is generally less than five per cent. on the cost of the plant.

The report says: "Interest is the actual interest paid or accrued during the year; and the depreciation is computed at five per cent. upon the cost as shown by the books." Interest and depreciation in this table are the same as figured by the commissioners, and *not* nine per cent., as in tables "A" and "B."

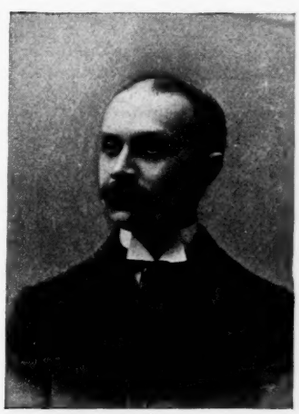
Chicopee.—Information from a perfectly reliable source is to the effect that the "light commissioners concede they are in error as to the average yearly cost per light." For Chicopee, instead of $130.69, the cost should be about $112.

Hudson.—Has operated its plant for 5½ months only.

Middleborough and Wakefield.—Items in column 4 include cost of both gas and electric plants.

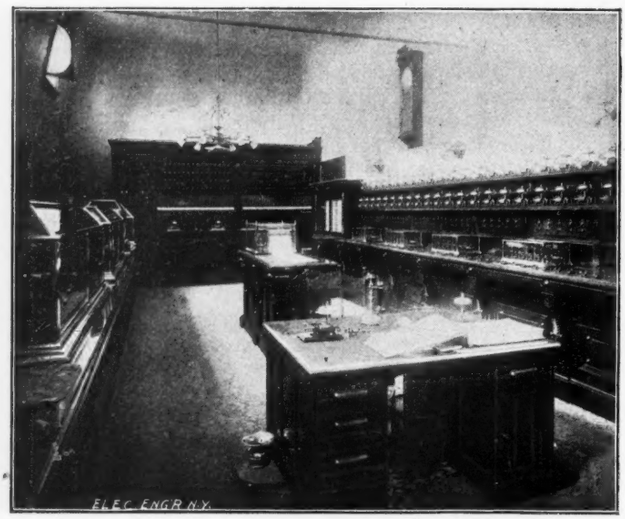
FIRE ALARM TELEGRAPH SYSTEM OF BALTIMORE.

Few cities have a more thoroughly equipped, modern or better managed fire alarm signal department than Baltimore, and the credit for the same is due largely to the superintendent of this department, Mr. Leona Lemon, under whose management several recent improvements have been made. The apparatus for operating the central station and the superintendent's office are located on the fourth floor of the City Hall Building, there being two large, well lighted and tastefully furnished rooms devoted to this purpose. The first is the superintendent's private office, and the second is arranged for the operators and the instruments, and between the two is a dark closet in which on two sides are arranged 96 storage battery cells of the chloride type, which furnish the current for operating signals. Until recently primary batteries of the ordinary bluestone type were employed, and of these 1,500 cells were required. By the change the superintendent estimates that a saving of $3,000 a year is effected in the expense of maintenance in favor of the storage battery, while it is more serviceable, reliable, clean, and requires less space. The storage batteries are divided into four sections, and three sections are charged every four days from current furnished by one of the lighting companies. A marble switchboard is located against the wall in the operating room, and this is provided with voltmeters and



LEONA LEMON.

ammeters for measuring both the incoming and the outgoing current from the batteries. There are also switches and pilot lamps that make the adjustment for charging a very simple matter. The board is divided into two sides, one for a 50-volt, the other for a 100-volt circuit, but only 50 volts are commonly employed. It takes only about 1-10 of an ampere to operate each circuit. Two operators on eight-hour shifts manipulate the signaling apparatus,



BALTIMORE, MD., FIRE ALARM DEPARTMENT.

which is arranged on two sides of the room. Forty circuits connect with the engine, truck, insurance patrol and such other stations as are entitled to receive all the signals, and there are 410 fire alarm boxes, to signal from which it is necessary to break a small glass plate in front of the box inclosing the key.

On entering the room the operators' desk is seen standing near the door and near the battery switchboard, and on the right side for the full length of the room are two banks of signal bells with switches and telegraph keys,

BALTIMORE, MD., FIRE ALARM DEPARTMENT.

there being a bell for each end of the circuit, all being mounted on handsomely finished cabinet counters. At the opposite end of the room is an elaborate switchboard, with plugs, drops and pilot lights, very like the boards used in telegraph offices, and so arranged that any instrument may be connected instantly with any circuit and any circuit with any instrument. On the left side of the room are three repeating instruments inclosed in glass cases, resting on a table, while an automatic registering device occupies the middle of the floor. The centre case of the repeating instruments is divided with three dials, having hands that turn like a large pointer of a clock. One of the dials indicates the unit figures, the second tens, and the third, or left-hand one, the hundreds. On a signal call from any box one operator reads the call and the other adjusts the hands on the dial. If, for instance, the box call is from 329, the operator at the register calls out the first figure "Three!" the other turns the hand on the dial at the left until it points to three. "Two!" calls out the operator at the register, when the hand on the middle dial is placed at two. "Nine!" concludes the crier, and the right hand dial is pointing to that figure. Then the attendant at the dials throws a lever, and instantly the gongs in every engine house, truck and water tower, fireboat house, salvage corps, newspaper and insurance office ring out the number "329," and the whole fire-fighting brigade of the city and every person having business interests relating to fires knows in a few seconds where the trouble is located.

It is a rule that where a particular apparatus of a certain district is detained at a fire for fifteen minutes some of the apparatus from neighboring district is transferred to supply the deficiency should a second call come in. This transfer is accomplished without special orders, the arrangement being provided for in the register. When a fire is out each company that has been on duty signals its return to the central office. In addition to the above, telegraph keys are provided by which each station can be signaled from the central office or any station can order supplies through a signaling code. There is also a telephone service between the central station and each of the engine and truck houses, independent of the city telephone exchange, and by means of which each company can talk with every other company and with the superintendent's office. This telephone equipment can also be used in sending out the fire signals should anything be out of order with the regular signaling apparatus, making virtually a double system of communication.

The wires connecting the stations are run in subways within a radius of one mile from the City Hall.

The signaling apparatus was manufactured by the Gamewell Fire Alarm Telegraph Company, of New York, and the switchboard by the Southern Electric Company, of Baltimore. Mr. Leona Lemon, under whose supervision this very important department has been brought to its present state of perfection, was the first secretary of the Association of Fire and Police Telegraph Superintendents and Municipal Electricians.—*C. B. Fairchild, in the Electrical Engineer.*

INSPECTED GARBAGE CREMATORIES.

The garbage reduction plant at Bridgeport, Conn., has shut down, and the board of health of that city expects to establish a crematory within a couple of months. Dr. Edward McLellan, health officer of the board, upon returning from a tour of inspection recently, said:

"I have visited a number of garbage plants during the past couple of weeks in the interest of the board of health. I went to Trenton, Wilmington, Washington and York, Pa. The plants visited were crematories of the Dixon and Brown design. The cities of Trenton, Wilmington and York have the Dixon plants, and they give genuine satisfaction, with but very little cost to the city. The real cost averages from 25 to 90 cents a ton for cremating. I am of the opinion that the garbage in this city could be disposed of by a Dixon plant for 40 cents a ton the year around.

"There is no question but what cremation is far ahead of reduction from a sanitary standpoint. I know that the garbage of this city can be burned up for considerable less than 70 cents per ton, the sum that was asked by the Re-

duction Company to carry on the work. Just about half that amount per ton would dispose of the garbage of this city through the cremating process.

"The smallest crematory I saw was in York, Pa. It had a capacity of disposing of about 20 tons a day. The exact cost of the plant was $8,000. This included the building, land and everything that went with the plant.

"The largest crematory was in Washington. This was of the Brown design, and the only one I saw of this kind. It was expected to dispose of 100 tons a day, but the manager of the plant told me that it could only handle 75. The cost of this plant was $16,500.

"Although the Brown is a good crematory, I would rather prefer the Dixon, as the latter has a better process in burning the garbage. If the city adopts the plan of disposing of the waste matter by a crematory, I would most urgently advise the use of the Dixon plant. It not only burns the garbage, but all odors that come from it."

MUNICIPAL IMPROVEMENT CONVENTION.

The fifth annual convention of the American Society of Municipal Improvements, to be held at Washington, D.C., Wednesday, Thursday and Friday, October 26, 27 and 28, promises to be the most successful ever held by the organization. On the programme there are many reports and papers of interest and incalculable value to workers in the field of municipal improvements, and the entertainment features of the convention arranged by Captain Lansing H. Beach, engineer commission of the District of Columbia, embrace a number of pleasing outings and functions.

HARRISON VAN DUYNE, PRESIDENT.

The convention will be opened in the banquet hall of the Arlington Hotel, Wednesday morning, by an address of welcome by John B. Wight, president of the commissioners of the District of Columbia. Harrison Van Duyne, of Newark, the president of the society, will respond to Mr. Wight, and will then deliver his annual address, in which the progress of the organization will be reviewed, and a number of notable questions pertaining to municipal improvements will be touched upon. Capt. L. H. Beach will present a paper upon the "Utilization of Sewage of Vienna." This paper is a translation of the report upon the subject by the commission appointed by the Austrian government to make a thorough study of the question, and the translation has been made, with comments thereon, by Capt. Beach.

A paper will be given upon "Tree Planting in the Streets of Washington," by William P. Richards, assistant engineer, engineer department, Washington. Mr. Richards will also contribute a paper upon "A Street Extension Plan for the Entire District of Columbia."

"Proposed Sewage Disposal for Washington, D. C.," will be treated in a paper by D. E. McComb, superintendent of sewers, District of Columbia. The first day's outline also includes the appointment of a committee on officers for the ensuing year and on choice of city for the next meeting.

Thursday morning will be devoted to a visit to the public buildings, including the capitol, new library building and the Smithsonian Institute.

Thursday afternoon at 2 o'clock the report of the committee on street paving will be read by Nelson P. Lewis, C. E., of Brooklyn, N. Y., the report having special reference to the construction of surface railroad tracks in public streets, with rail sections, foundations, etc.

The following papers will also be read: "The Selection of Paving Material," by George W. Tillson, C. E., of Brooklyn, N. Y.; "The Proper Regulating of Curbing and Streets," by Horace Andrews, city engineer, Albany, N. Y.; "The Cost of Repairs to Asphalt Pavements in Buffalo," by E. B. Guthrie, late chief engineer Board of Public Works, Buffalo, at present engineer to the grade crossing commission; "The Transmission of Typhoid Fever by Sewage Polluted Oysters," by Kenneth Allen, assistant engineer of the sewage commission of Baltimore. The election of officers, selection of location of next meeting and other committee reports will conclude Thursday's exercises.

On Friday will be given a paper by Harold P. Brown, electrical engineer, of New York, upon "Electrolysis Tests at Dayton, Ohio," and a paper upon "Electrolysis in Davenport, Ia.," by the electrician of that city. The committee on municipal data, Charles C. Brown, C. E., chairman, is preparing a report of special interest, in which will be set out special forms for reports of cities, so that definite information may more readily be obtained from these reports. It is hoped that the special forms of reports may be recommended to the proper authorities as a basis for the statistical tables on municipal work of the next census. George H. Benzenberg, C. E., of Milwaukee, Wis., chairman of the committee on review, will submit the report of his committee. The work of the convention will be followed by an excursion down the Potomac to Mount Vernon and other points of interest.

BIG SEWER PROJECT.

An interesting sewerage project which seems likely to assume definite form in the near future is that of the construction of a tidewater sewer to accommodate a portion of the city of Newark and the villages of South Orange, Irvington, Vailsburg, portions of the townships of West Orange and Milburn, and of Orange and East Orange, all in the State of New Jersey. The surveys and plans for this sewer have been prepared by Alexander Potter, consulting engineer of New York city, and the estimated cost of the trunk sewer alone amounts to about $250,000. Mr. Potter is now engaged in preparing a method of assessments for the various municipalities interested. Most of these towns have the necessary legal powers to proceed with this work at once, and if a satisfactory system of assessments can be devised the work of construction should be proceeded with within the next few months.

CITY GOVERNMENT.

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SPECIAL NOTICE.

City officials and friends of City Government visiting New York are cordially invited to make the office of City Government their headquarters during their stay in the city. Desks, stenographers and stationery are placed at their disposal, and their mail may be addressed in our care.

NOTE AND COMMENT.

The present agitation on the subject of asphalt paving prices in New York city, reported in another column of this paper, brings to mind the extremely low figures at which asphalt paving contracts have been undertaken in many cities, and brings up a most interesting conjecture as to the ultimate results of the keen competition that has arisen in that field. So long as one company or one combination of companies had absolute control of asphalt paving in the United States the prices were exorbitant and the profits to the contractors were immense. The public, however, were sufferers to such a great extent that these conditions could not and did not continue. The monopoly has been broken up, but the competition of the present time is not without danger to the people. Mathematical facts demonstrate that both the old and the new asphalt companies have taken contracts at figures so low that their profits are not only cut off, but genuine losses are insured to them. So long as the contractors are financially able to pocket their losses, the public will profit therefrom, but there is a threatening aspect of the matter that should not be ignored. Every pavement that is laid with a loss to the contractor threatens to bring loss also to the public. The loss to the public may come either in the form of defeasible contracts or in the restoration of the monopoly.

Some years ago the city of New York had a costly experience that is worth recalling in connection with the subject of asphalt paving competition. The Matt Taylor Company took a contract to pave Eighth avenue at a figure so low that there could be no profit in the work. The city secured itself by retaining 30 per cent. of the total amount of the contract to guarantee the maintenance of the pavement for fifteen years. The Taylor Company, having no profit in the contract and nothing but a heavy loss on the maintenance in prospect, was compelled to default in the work. In five years after the pavement had been completed the 30 per cent. of the contractors' money retained by the city was entirely expended for the maintenance of the pavement, and it became necessary to make a contract with another company to maintain the pavement for the remaining ten years of the guarantee period, and this cost the city the neat sum of $190,000. Such cases as this are likely to occur in other cities where paving contracts are let at losing figures.

The restoration of the asphalt monopoly is a very remote possibility. Such companies as the Alcatraz, the Assyrian and the Trinidad are financially able to carry on a losing competition for years; but will they have the disposition to do so? Business men must not be expected to lose money continually. The public may reasonably expect a combination of the asphalt companies unless the competition between them settles on a basis which will allow them fair profits. It is very likely the competition will settle on this satisfactory basis now that the comparatively new asphalt companies have secured a good footing for their materials in most of the large cities. The extremely low prices that have obtained during the past few years were brought about by the determined fight on the part of the new companies to introduce and prove the worth of their products in the large cities. Now that this fight has been won, city officials and property owners need not expect the extremely low prices to continue much longer.

Mayor R. J. Saltsman, of Erie, Pa., is not satisfied with the management of the water works department of his city. He has written a couple of very long and convincing articles to show that the Erie water department produces no financial returns despite the fact that the rates are higher than those of cities of similar population and condition. The mayor's last article, published on September 27, was rather warm, as will be seen from the following excerpt:

> Why have needed city improvements been neglected? Why, indeed? Because the Erie Water Works, like a gigantic, insatiable leech, has been perpetually sucking the life blood from the city funds. That is the sponge which absorbs the cash and keeps our treasury drained, year after year, and the present management does not seem to stop at any methods, fair or foul, to perpetuate this monstrous outrage on the taxpayers of Erie.

Mayor Saltsman is not the kind of a man to use such language without reason. It is more than likely that he knows what he is talking about, and that he will keep after the water board until he gets them on the right track.

The council of Sioux City, Ia., turned down an appropriation of $100 for sending Chief Geo. Kellogg to the St. Louis convention of the International Association of Fire Engineers. Mr. Kellogg is one of the ablest fire chiefs in the business, yet he is not unlike the others who gain knowledge from their contemporaries at international conventions to aid them in giving improved services to their cities. That a bright, progressive man like the Sioux City chief could not get $100 worth of benefit for his city out of the St. Louis convention we will never concede. Perhaps the Sioux City aldermen are contented with the present status of their fire department and have no desire to keep it in line with the progress of the times. Probably they believe that Chief Kellogg can worry along without attending conventions for the purpose of studying the advancement of American fire service. True, he can. So can the people worry along without music in the public parks, without street signs

on the corners, without filtering impure public water supplies, without providing the latest and best methods of fire protection, but life would be more burdensome and a great deal shorter. If it is true that Sioux City cannot afford to spend $100 to send its fire chief to a great and helpful convention, the council ought to go into executive session to say so. Don't advertise it to the world.

While on this subject of sending delegates to conventions at public expense we want to call attention to the fact that the parsimonious comptroller of the city of St. Paul refused to allow Secretary John Caulfield's expenses in attending the last meeting of the American Water Works Association. The comptroller referred the bill to the corporation attorney and here is the opinion given by that official:

> Assuming that the sending of a representative of the board to attend the gathering of representatives of the waterworks systems of other cities, and the interchange of views as to improvements in methods, etc., is in the direction of accomplishing the purpose contemplated by the act creating the board of water commissioners, I have no doubt but that it was within the authority of the board * * * to direct the payment of the expenses of its representative. * * * I am therefore of the opinion that the objections of the comptroller are not well taken.

The corporation attorney talks good law and good sense. And the comptroller—paid the bill.

PUBLIC LIGHTING.

—In the Minneapolis council a resolution by Alderman Kiichli, providing for the submission to the people of a proposition to issue $300,000 worth of city bonds for the construction of an electric light plant, was defeated.

—The Peoria, Ill., city council made a contract with the Peoria General Electric Company for street lighting for the year beginning November 1. The contract price per arc lamp per year, 2,000 c. p., all night and every night, is $90.

—Bids for public electric lighting in Philadelphia for the year 1899 were opened on October 4. The bids, which are on arc light of 2,000 c. p., burning all night and every night, varied from 29 to 36 cents per night, according to the conditions, whether the wires run on poles, in underground conduits owned by the bidder, or in underground conduits owned by the city.

—Mayor Perry, of Grand Rapids, Mich., has vetoed the ordinance granted by the council allowing a new electric light company to erect poles and string wires. In the veto the mayor announces that he has come to the conclusion that the city should receive some compensation for the franchise and recommends that a graduated tax on the gross income, running from two to five per cent., be charged.

—Elmira, N. Y., is to have an increase of arc lamps from 249 to 300 under a new contract which begins on November 7. The price to be paid by the city is $80 per lamp per year, a reduction of $20.20 per lamp from the price paid under the former contract. This desirable contract was effected through an investigation made by the lamp committee of the common council, whose report claimed that under municipal ownership the arc lamps could be operated at an expense of $59.30 per lamp per year.

WATER DEPARTMENT ITEMS.

—J. W. O'Neil has succeeded Elias Summerfield as receiver of the Topeka (Kan.) Water Company.

—The Atlantic City, N. J., water department writes: "The results accomplished by the meter system have exceeded all expectations. The waste which has been stopped was greater than anyone surmised. Stopping this waste has been a hardship to very few, while the benefit reaches every taxpayer in the city. No one is deprived of an abundant supply."

—Mr. L. N. Case, for thirty-one years connected with the Detroit waterworks, has been offered the position of manager of the new municipal light and water plant at Duluth, Minn. If Mr. Case accepts the position the city of Duluth is to be congratulated upon securing the services of one of the most efficient waterworks men in this country.

—The Central States Waterworks Association, at their recent convention in Springfield, Ohio, elected officers for the ensuing year as follows: President, T. R. Cook, of Toledo; first vice-president, C. W. Wilds, of Delaware, Ohio; second vice-president, James P. Malay, of Sidney, Ohio; third vice-president, George S. Cotter, of Springfield, Ohio; fourth vice-president, A. W. Inman, of Massillon, Ohio; secretary, John Fischer, of Hamilton, Ohio; executive committee, William A. Veach, of Newark, Ohio; C. W. Coons, of Mt. Vernon, Ohio; and Jeremiah O'Shaughnessy, of Columbus, Ohio.

—The issue of $200,000 of bonds for the improvement and extension of waterworks at Atlanta, Ga., was defeated at a special election on October 5. Under the constitution of the State governing such issues of bonds a two-thirds vote of the entire registration is required to authorize them. The total registration for the bond election at Atlanta was 8,479, and two-thirds of that number is 5,653. Only 5,166 votes were polled, 5,002 for and 164 against the bond issue. So the bonds failed for the need of 651 votes. Mayor Collier and Judge Hillyer, president of the water board, are much disappointed over the result of the election.

NATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS.

A meeting of the executive committee of the National Association of Fire and Police Telegraph Superintendents and Municipal Electricians was held at the Clayton House, Wilmington, Del., on Saturday, October 8, for the purpose of discussing matters of importance connected with the work of the association, the election of new members and arranging for papers and addresses to be presented at the next convention, which takes place in Wilmington in September, 1899. The committee were the guests of President J. W. Aydon, who entertained them with true Southern hospitality, and on Sunday the Wilmington and Nothern Railroad placed at the disposal of Mr. Aydon the fine steamer "Laura B," which conveyed an appreciative party to Delaware City, where a country dinner was heartily enjoyed.

Wilmington has many historical attractions and large industrial establishments, and will prove an interesting place to all who attend the convention. The Board of Trade has recognized the compliment of holding the convention in Wilmington, by appointing a special committee to make arrangements for the accommodation and entertainment of all who come. Mr. John C. Farra is chairman of the committee, which is composed of J. W. Aydon, George B. Moore, A. S. Reed and J. M. Satterthwaite.

The association is rapidly increasing in membership, and it is the duty of every progressive and ambitious city official connected with the electrical department to give it his hearty support. Mr. Aydon will be glad to hear from all who are not members and advise them of the necessary qualifications for membership, and will also send the report of the recent interesting convention at Elmira.

FIRE DEPARTMENT STATISTICS.

The following statistical statements, compiled by the bureau of information of the League of American Municipalities, show the number of men, with rank or grade and salaries paid, in fire departments of leading cities. The publication of these statistics, showing a number of additional cities, will be continued in the next number of CITY GOVERNMENT.

ATLANTA, GA.

1	Chief,	$4,000.00
1	Asst. Chief,	1,400.00
2	Asst. Chiefs, $1,300 each,	2,600.00
1	Supt. Fire Alarm,	1,200.00
1	Secretary,	1,000.00
9	Foremen, $1,200 each,	10,800.00
5	Asst. Foremen, $1,080 each,	5,400.00
2	Engineers, $1,080 each,	2,160.00
3	Stokers, $840 each,	2,520.00
17	Drivers, $840 each,	14,280.00
13	Laddermen, $780 each,	10,140.00
46	Hosemen, $780 each,	35,880.00
101	Total,	$91,380.00

Days off with pay: Every eleventh day.
Area of city: 12 square miles.
Population: Estimated 1898, 110,000.
Chief: W. R. Joyner.

ALBANY, N. Y.

	Permanent Force:	
1	Chief,	$3,000.00
1	Asst. Chief,	1,500.00
1	Clerk,	1,500.00
1	Supt. Fire Alarm,	1,500.00
1	Asst. Supt. Fire Alarm,	1,240.00
2	Operators, Fire Alarm, $1,000 each,	2,000.00
1	Lineman, Fire Alarm,	900.00
1	Batteryman, Fire Alarm,	720.00
1	Supt. Hose and Supply Depots,	1,200.00
1	Asst. Supt. Hose and Supply Depots,	720.00
10	Engineers, $1,080 each,	10,800.00
10	Stokers, $720 each,	7,200,00
13	Drivers, $720 each,	9,360.00
3	Tillermen, $720 each,	2,160.00
71	Hosemen and Laddermen, $720 each,	51,120.00
1	Relief Engineer,	1,080.00
3	Relief Men, $720 each,	2,160.00
122	Total,	$98,160.00
	Call Force:	
1	Asst. Engineer,	$400.00
10	Foremen of Steamers, $300 each,	3,000.00
3	Foremen of Trucks, $300 each,	900.00
45	Hosemen and Laddermen, $200 each,	9,000.00
1	Veterinary Surgeon (medicines included),	600.00
1	Physician,	500.00
1	Secretary,	500.00
62	Total,	$14,900.00
184	Grand Total,	$113,060.00

Days off with pay: Every tenth day.
Area of city: 10.73 square miles.
Miles of streets: 141.
Population: Census 1890, 94,923; estimated 1898, 106,260.
Chief: M. E. Higgins.

PENSION ROLL.

There are 21 pensioners, receiving from $100 to $750 each per year, the total annual pensions amounting to $4,520. This fund comes from 2 per cent. tax on receipts of foreign fire insurance companies, donations, bequests, fines and interest. The fund is maintained without expense to the taxpayers of the city.

COLUMBUS, OHIO.

1	Superintendent,	$2,000.00
1	Asst. Supt,	1,200.00
1	Asst. Supt. and Supt. of Machinery,	1,200.00
1	Asst. Supt. and Supt. Fire Alarm,	1,200.00
1	Foreman of Telegraph Lines,	900.00
20	Captains, $1,020 each,	20,400.00
20	Lieutenants, $960 each,	19,200.00
13	Engineers, $1,020 each,	13,260.00
13	Stokers, $900 each,	11,700.00
80	Hose and Ladder Men, $900 each,	72,000.00
3	Operators, $720 each,	2,160.00
154	Total,	$145,220.00

[NOTE.—Hose and ladder men are paid $720 for first year's service and $900 for the second and subsequent years. Operators are paid $420 the first year, $480 the second year, $520 the third year, $600 the fourth year and $720 the fifth and subsequent years. In the above statement the maximum salaries are given.]

Days off with pay: Every seventh day.
Area of city: 16.5 square miles.
Miles of streets: 116.
Population: Census 1890, 88,150; estimated 1898, 130,000.
Superintendent: Henry Heinmiller.

PENSION ROLL.

There are 11 pensioners, receiving from $72 to $600 each per year, the total annual pensions amounting to $2,232.

CHARLESTON, S. C.

	Permanent Force:	
1	Chief,	$1,500.00
1	Asst. Chief,	1,000.00
1	Foreman Combination Chem. and Truck,	840.00
6	Engineers, $900 each,	5,400.00
6	Stokers, $600 each,	3,600.00
4	Tillermen, $600 each,	2,400.00
1	Asst. Tillerman,	425.00
1	Batteryman,	480.00
1	Lineman,	420.00
24	Drivers, $414 each,	9,936.00
46	Total,	$26,001.00
	Call Force:	
1	Supt. of Horses and Vet. Surgeon,	$300.00
7	Foremen, $255 each,	1,785.00
39	Hosemen, $235 each,	9,165.00
6	Truckmen, $235 each,	1,410,00
53	Total,	$12,660.00
99	Grand Total,	$38,661.00

[NOTE.—Extra allowances of $600 for superintendence of fire alarm system and $125 for night drivers for the chief are allowed.]

Days off with pay: Engineers, every other night; drivers, one night each week and one Sunday each month.
Area of city: 3 square miles.
Miles of streets: 60.
Population: Estimated 1898, 63,000.
Chief: O. G. Marjenhoff.

DULUTH, MINN.

1	Chief,	$2,500.00
2	Asst. Chiefs, $1,080 each,	2,160.00
1	Supt. Fire Alarm,	1,200.00
2	Linemen, $780 each,	1,560.00
1	Fire Warden,	780.00
1	Blacksmith,	900.00

1	Blacksmith,	780.00
1	Wagon Maker,	720.00
9	Captains, $840 each,	7,560.00
9	Lieutenants, $780 each,	7,020.00
1	Lieutenant,	720.00
3	Engineers, $900 each,	2,700.00
1	Engineer,	600.00
3	Stokers, $780 each,	2,340.00
14	Pipemen, $720 each,	10,080.00
7	Pipemen, $660 each,	4,620.00
12	Truckmen, $720 each,	8,640.00
2	Truckmen, $660 each,	1,320.00
13	Drivers, $720 each,	9,360.00
5	Drivers, $660 each,	3,300.00
89	Total,	$68,860.00

Days off with pay: Sixty hours off each month, at intervals of three "offs" in 10 days, morning, afternoon and night.

Area of city: 67.25 square miles.
Miles of graded streets: 220.
Population: Estimated 1898, 60,000.
Chief: John T. Black.

DALLAS, TEX.

1	Chief,	$1,200.00
1	Asst. Chief,	900.00
1	Electrician,	1,080.00
4	Engineers, $840 each,	3,360.00
8	Captains, $720 each,	5,760.00
28	Firemen, $600 each,	16,800.00
43	Total,	$29,100.00

Days off with pay: Two each month.
Area of city: 9.25 square miles.
Miles of streets: 139.
Population: Estimated 1898, 60,000.
Chief: H. F. Magee.

EVANSVILLE, IND.

1	Chief,	$1,800.00
1	Asst. Chief,	1,200.00
1	Fire Alarm Electrician,	1,200.00
11	Captains, $816.40 each,	8,980.40
1	Captain,	780.00
3	Engineers, $876.20 each,	2,628.60
1	Engineer,	839.80
27	Hosemen, Truckmen and Drivers, $764.40 each,	20,738.80
13	Hosemen, Truckmen and Drivers, $764. each,	9,464.00
2	Hosemen, Truckmen and Drivers, $624 each,	1,248.00
1	Clerk,	1,500.00
62	Total,	$50,379.60

[NOTE.—The Common Council of Evansville has decided to increase the wages of firemen on November 1, 1898.]

Days off with pay: Twelve hour "offs" every week, 24 hour "offs" every month, and 7 days every year.

Area of city: 5.5 square miles.
Miles of streets: 140.
Population: Estimated 1898, 80,000.
Chief: C. S. Woods.

FALL RIVER, MASS.

1	Chief,	$1,500.00
1	Asst. Chief,	600.00
3	District Chiefs, $250 each,	750.00
13	Captains, $1,050 each,	13,650.00
1	Engineer,	1,200.00
5	Engineers, $1,020 each,	5,100.00
22	Drivers, $900 each,	19,200.00
17	Hosemen, $900 each,	15,300.00
12	Laddermen, $900 each,	10,800.00
1	Electrician,	900.00
85	Call Men, $150 each,	12,750.00
1	Clerk,	100.00
1	Driver of Fuel Wagon,	900.00
163	Total,	$82,750.00

Days off with pay: Two of 24 hours each every month. Vacation of ten days every year.

Area of city: 41 square miles.
Miles of streets: 126.
Population: 102,000.
Chief: James Langford.

GRAND RAPIDS, MICH.

1	Fire Marshal,	$2,000.00
1	Asst. Marshal,	1,400.00
1	Battalion Chief,	1,200.00
1	Superintendent Fire Alarm,	1,350.00
13	Captains, $912.50 each,	11,862.50
15	Lieutenants, $766.50 each,	11,497.50
7	Engineers, $1,000 each,	7,000.00
6	Assist. Engineers, $730 each,	4,380.00
27	Pipemen, $730 each,	19,710.00
18	Laddermen, $730 each,	13,140.00
1	Ladderman (part pay),	200.00
26	Drivers, $693.50 each,	18,031.00
1	Foreman of Construction,	766.50
2	Inspectors, $678 each,	1,356.00
1	Stenographer and Typewriter,	600.00
121	Total,	$94,493.50

[NOTE.—$350.00 of the salary of the Superintendent of Fire Alarm and $360.00 of the salary of the stenographer are charged to the Police Department.]

Days off with pay: Two of 24 hours each every month.

Area of city: 17.75 square miles.
Miles of streets: 283.
Population: Census 1890, 68,000. Estimated 1898, 100,000.
Marshal: Henry Lemoin.

HARTFORD, CONN.

Permanent Force:

1	Chief,	$2,500.00
1	Supt. Fire Alarm,	1,700.00
1	Asst. Supt. Fire Alarm,	1,000.00
1	Lineman,	900.00
1	Substitute,	1,000.00
1	Foreman,	750.00
16	Drivers, $900 each,	14,400.00
3	Drivers, $850 each,	2,550.00
1	Pipeman,	750.00
8	Engineers, $1,200 each,	9,600.00
2	Asst. Engineers, $900 each,	1,800.00
2	Tillermen, $900 each,	1,800.00
2	Firemen, $750 each,	1,500.00
2	Tillermen, $850 each,	1,700.00
42	Total,	$41,950.00

Call Force:

3	Asst. Engineers, $350 each,	$1,050.00
9	Foremen, $300 each,	2,700.00
4	Firemen, $225 each,	900.00
20	Bunkers, $225 each,	4,500.00
48	Hosemen, $200 each,	9,600.00
13	Laddermen, $200 each,	2,600.00
97	Total,	$21,350.00
139	Grand Total,	$63,300.00

Days off with pay: 2 days per month and five days vacation each year.

Miles of streets: 109.
Population: Estimated 1898, 76,000.
Chief: Henry J. Eaton.

JERSEY CITY, N. J.

3	Commissioners, $1,000 each,	$3,000.00
1	Clerk of Board,	2,000.00
1	Chief Engineer,	2,500.00
1	Asst. Engineer,	2,000.00
2	Battalion Chiefs, $1,500 each,	3,000.00
1	Medical Examiner,	500.00
1	Inspector of Horses,	800.00
1	Superintendent of Telegraph,	2,000.00
5	Telegraph Linemen, $1,000 each,	5,000.00
15	Captains of Engine Companies, $1,200 each,	18,000.00
5	Captains of Hook and Ladder, $1,200 each,	6,000.00
15	Engineers of Steamers, $1,100 each,	16,500.00
15	Stokers, $1,000 each,	15,000.00
15	Steamer Drivers, $1,000 each,	15,000.00
15	Tender Drivers, $1,000 each,	15,000.00
5	Truck Drivers, $1,000 each,	5,000.00
5	Tillermen, $1,000 each,	5,000.00
45	Hosemen, $950 each,	42,750.00
25	Truckmen, $950 each,	23,750.00
176	Total,	$182,800.00

Days off with pay: One day (24 hours) every 10 days.
Area of city: 13 square miles.
Miles of streets: 200.
Population: Census 1890, 163,003. Estimated 1898, 195,000.
Chief: John Conway.

PENSION ROLL.

There are five pensioners and the roll amounts to $2,050 per year.

KANSAS CITY, MO.

1	Chief,	$2,700.00
1	Asst. Chief,	1,800.00
1	Asst. Chief,	1,500.00
1	Master Mechanic,	1,350.00
1	Secretary,	1,350.00
23	Foremen, $972 each,	22,356.00
7	Engineers, $972 each,	6,804.00
7	Stokers, $864 each,	6,048.00
117	Firemen, $864 each,	101,088.00
18	Watch Boys, $420 each,	7,560.00
177	Total,	$152,556.00

Days off with pay: One day of 24 hours each week.
Area of city: 26 square miles.
Miles of streets: 600.
Population: Estimated 1898, 185,000.
Chief: George C. Hale.

LOUISVILLE, KY.

1	Chief,	$2,500.00
4	Asst. Chiefs, $1,400 each,	5,600.00
1	Secretary,	1,400.00
1	Aide to Chief,	912.50
1	Chief Operator,	1,380.00
24	Captains, $1,003.75 each,	24,090.00
17	Engineers, $1,080 each,	18,360.00
38	Pipemen, $912.50 each,	34,675.00
17	Stokers, $821.25 each,	13,961.25
45	Drivers, $821.25 each,	36,956.25
29	Laddermen, $912.50 each,	26,462.50
1	Towerman,	821.25
1	Foreman Repair Shop,	900.00
1	Asst. Foreman Repair Shop,	821.25
1	Harness Maker,	821.25
4	Operators, $912.50 each,	3,650.00
3	Linemen, $912.50 each,	2,737.50
1	Batteryman,	821.25
190	Total,	$176,870.00

Days off with pay: Two days or 48 hours each month.
Area of city: 20.5 square miles.
Miles of streets: 286.
Population: Census of 1890, 164,000. Estimated 1898, 215,000.
Chief: Major Edward Hughes.

LAWRENCE, MASS.

Permanent Force:

1	Chief, Supt. Fire Alarm and Building Inspector,	$1,300.00
6	Captains, $960 each,	5,760.00
2	Lieutenants, $910 each,	1,820.00
14	Drivers, $910 each,	12,740.00
5	Hosemen, $910 each,	4,550.00
1	Ladderman,	910.00
29	Total,	$27,080.00

Call Force:

2	Asst. Engineers, $300 each,	$600.00
1	Captain,	250.00
3	Lieutenants, $225 each,	675.00
4	Enginemen, $225 each,	900.00
4	Stokers, $200 each,	800.00
37	Hosemen, $200 each,	7,400.00
18	Laddermen, $200 each,	3,600.00
69	Total,	$14,225.00
98	Grand Total,	$41,305.00

Days off with pay: Two days each month and 12 days' vacation each year.
Area of city: 7 square miles.
Miles of streets: 95.
Population: Census 1890, 44,654. Estimated, 1898, 56,000.
Chief: Melvin Beal.

MINNEAPOLIS, MINN.

1	Chief Engineer,	$3,000.00
1	Asst.,	1,800.00
1	Asst.,	1,700.00
1	Asst.,	1,400.00
1	Fire Marshal,	1,200.00
1	Supt. Fire Alarm Tel.,	1,680.00
1	Asst. Supt. Fire Alarm Tel.,	1,020.00
1	Lineman,	900.00
1	Secretary,	1,200.00
1	Asst.,	800.00
1	Vet. Surgeon,	1,380.00
1	Master Mechanic,	1,320.00
3	Operators, $660 each,	1,980.00
25	Captains, $1,020 each,	25,500.00
1	Captain,	990.00
29	Lieutenants, $900 each,	26,100.00
2	Lieutenants, $870 each,	1,740.00
14	Engineers, $984 each,	13,776.00
5	Engineers, $960 each,	4,800.00
14	Assistants, $900 each,	12,600.00
5	Assistants, $870 each,	4,350.00
74	Pipemen, $870 each,	84,380.00
5	Pipemen, $840 each,	4,200.00
7	Pipemen, $780 each,	5,460.00
52	Drivers, $870 each,	45,240.00
2	Drivers, $840 each,	1,680.00
42	Laddermen, $870 each,	36,540.00
2	Watchmen, $600 each,	1,200.00
294	Total,	$267,936.00

Days off with pay: One half day every third day, and one night every ninth day. Ten days furlough each year.
Area of city: 53.29 square miles.
Miles of streets: 789.
Population: Census of 1890, 164,738. Estimated 1898, 210,000.
Chief: Frank L. Stetson.

MILWAUKEE, WIS.

1	Chief Engineer,	$3,600.00
1	Asst. Chief Engineer,	2,100.00
2	Asst. Chief Engineers, $2,000 each	4,000,00
1	Secretary,	1,200.00
1	Chief Examiner,	300.00
1	Master Mechanic,	1,700.00
1	Vet. Surgeon,	700.00
1	Asst. Supt. Fire Alarm Telegraph,	2,000.00
4	Linemen, $960 each,	3,840.00
6	Operators, $900 each,	5,400.00
19	Members of Dept. Repair Shop, $1,080 each,	20,520.00
31	Captains, $1,200 each,	37,200.00
31	Lieutenants, $1,100 each,	34,100.00
87	Pipemen, $960 each,	83,520.00
36	Truckmen, $960 each,	34,560.00
26	Engineers, $1,200 each,	31,200.00
20	Asst. Engineers, $1,100 each,	22,000.00
55	Drivers, $960 each,	52,800.00
6	Firemen, $1,100 each,	6,600.00
6	Pilots, $1,200 each,	7,200.00
336	Total,	$354,540.00

Days off with pay: Three each month and a 10 day vacation.
Area of city: 23 square miles.
Population, 285,000.
Chief: James Foley.

MEMPHIS, TENN.

1	Chief,	$1,800.00
1	Asst. Chief,	1,500.00
1	Supt. Fire Alarm,	1,200.00
1	Secretary,	1,020.00
8	Captains, $1,320 each,	10,560.00
5	Engineers, $1,200 each,	6,000.00
44	Firemen, $900 each,	39,600.00
2	Operators, $420 each,	840.00
63	Total,	$62,520.00

Days off with pay: One day of 18 hours every 12 days.
Area of city: 6 square miles.
Miles of streets: 255 miles.
Population: 1890, 75,000. Estimated 1898, 110,517.
Chief: W. F. Carroll.

NEW HAVEN, CONN.

1	Superintendent,	$2,500.00
1	Fire Marshal,	1,680.00
1	Asst. Chief,	1,350.00
1	Supt. Fire Alarm Telegraph,	1,500.00
1	Clerk,	1,200.00
2	Captains, $1,200 each,	2,400.00
2	Captains, $1,150 each,	2,300.00
2	Captains, $1,100 each,	2,200.00
2	Captains, $1,050 each,	2,100.00
3	Captains, $1,000 each,	3,000.00
11	Lieutenants, $900 each,	9,900.00
1	Engineer,	1,250.00
7	Engineers, $1,200 each,	8,400.00
2	Asst. Engineers, $950 each,	1,900.00
1	Asst. Engineer,	900.00
5	Asst. Engineers, $850 each,	4,250.00
10	Drivers, $900 each,	9,000.00
24	Hosemen, $850 each,	20,400.00
2	Hosemen, $800 each,	1,600.00
12	Hosemen, $750 each,	9,000.00
10	Hook and Ladder Men, $850 each,	8,500.00
8	Hook and Ladder Men, $750 each,	6,000.00
112	Total,	$101,330.00

Days off with pay: Two each month, or 48 consecutive hours.
Area of city: 22½ square miles.
Miles of streets: About 190.
Population: Census of '90, 85,981. Estimated 1898, 112,000.

PENSION ROLL.

There are three pensioners, and the total annual pension roll is $2,375.

NASHVILLE, TENN.

1	Chief,	$1,800.00
1	Asst. Chief,	1,200.00
1	Supt Fire Alarm Telegraph,	1,200.00
1	City Electrician,	720.00
11	Captains, $900 each,	9,900.00
8	Lieutenants, $840 each,	6,720.00
6	Engineers, $900 each,	5,400.00
6	Stokers, $810 each,	4,860.00
19	Drivers, $810 each,	15,390.00
1	Driver Chief's Buggy,	480.00
1	Lineman,	810.00
24	Hosemen and Laddermen, $810 each,	19,440.00
80	Total,	$67,920.00

Days off with pay: Seven each year.
Area of city: 9.43 square miles.
Miles of streets: 164.27.
Population: Census 1898, 87,754.
Chief: Elza M. Carell.

OMAHA, NEB.

1	Chief,	$3,000.00
1	Asst. Chief,	1,800.00
1	Second Assistant Chief,	1,200.00
16	Captains, $960 each,	15,360.00
16	Lieutenants, $900 each,	14,400.00
4	Engineers, $1,020 each,	4,080.00
4	Assistant Engineers, $840 each,	3,360.00
19	Drivers, $840 each,	15,960.00
4	Drivers, $780 each,	3,120.00
40	Pipemen and Truckmen, $840 each,	33,600.00
7	Pipemen and Truckmen, $780 each,	5,460.00
1	Secretary,	840.00
114	Total,	$102,180.00

Days off with pay: Ten days' furlough each year and 24 hours every 9 days.
Area of city: 26½ square miles.
Population: 150,000.
Chief: John Redell.

PATERSON, N. J.

1	Chief Engineer,	$1,800.00
2	Assistants, $1,300 each,	2,600.00
1	Supt. Fire Alarm,	1,300.00
13	Captains, $1,000 each,	13,000.00
10	Engineers, $975 each,	9,750.00
73	Drivers, Hosemen and Laddermen, $950 each,	69,350.00
1	Lineman,	850.00
1	Lineman,	780.00
102	Total,	$99,430.00

Days off with pay: Three each month, and annual vacations with pay as follows: Chief, 15 days; all other officers, 12 days; drivers, hosemen and laddermen, 10 days.

Area of city: 8¾ square miles.
Miles of streets: 210.
Population: Census of 1890, 78,358. State census of 1895, 97,344. Estimated 1898, 110,000.
Chief: John Stagg.

PEORIA, ILL.

1	Fire Marshal,	$1,400.00
1	Assistant Marshal,	1,100.00
1	City Electrician,	1,200.00
1	Lineman,	780.00
7	Captains, $840 each,	5,880.00
3	Engineers, $960 each,	2,880.00
3	Stokers, $780 each,	2,340.00
12	Drivers, $780 each,	9,360.00
21	Hosemen, $780 each,	16,380.00
6	Hook and Ladder Men, $780 each,	4,680.00
54	Total,	$46,000.00

Days off with pay: Every tenth day 24 hours, and one week vacation each year.
Area of city: 6 square miles.
Miles of streets: 120.
Population: Census of 1890, 42,000. Estimated 1898, 65,000.
Fire Marshal: Carl Moeller.

PORTLAND, ME.

	Permanent Force:	
2	Captains, $900 each,	$1,800.00
7	Engineers, $900 each,	6,300.00
1	Stoker,	840.00
18	Drivers, $821.25 each,	14,782.50
1	Tillerman,	821.25
1	Hoseman,	821.25
1	Supt. of Hose,	821.25
31	Total,	$26,186.25
	Call Force:	
1	Chief,	$1,000,00
1	Asst. Chief,	225.00
3	Asst. Chiefs, $175 each,	525.00
9	Captains, $135 each,	1,215.00
9	Lieutenants, $125 each,	1,125.00
5	Stokers, $125 each,	625.00
63	Hosemen, $120 each,	7,560.00
24	Laddermen, $120 each,	2,880.00
115	Total	$15,155.00
146	Grand Total,	$41,341.25

Days off with pay: 2 each month or 48 hours.
Area of city: 2.75 square miles.
Miles of streets: 56.
Population: 41,156.
Chief: M. N. Eldridge.

SYRACUSE, N. Y.

1	Chief,	$2,000.00
1	1st Asst. Chief,	1,500.00
1	2nd Asst. Chief,	1,200.00
1	Supt. Fire Alarm Telegraph,	1,200.00
1	Clerk,	1,200.00
13	Captains, $960 each,	12,480.00
8	Engineers, $900 each,	7,200.00
2	Tillermen, $900 each,	1,800.00
79	Firemen, $800 each,	63,200.00
107	Total,	$91,780.00

Days off with pay: 54 hours every month and 10 days' vacation each year.
Area of city: 15½ square miles.
Miles of streets: 225.
Population: About 125,000.
Chief: John Quigley.

SAGINAW, MICH.

1	Chief,	$1,400.00
1	Asst. Chief,	800.00
10	Captains, $720 each,	7,200.00
11	Drivers, $600 each,	6,600.00
1	Engineer,	700.00
7	Full Paid Hosemen, $600 each,	4,200.00
11	Part Paid, $300 each,	3,300.00
42	Total,	$24,200.00

Days off with pay: Three each month.
Area of city: 17 square miles.
Population: 55,000.
Chief: George W. Wallis.

TOLEDO, OHIO.

1	Chief,	$2,250.00
1	Asst. Chief,	1,500.00
1	Asst. Chief,	1,200.00
1	Supt. Fire Alarm Telegraph,	1,200.00
16	Captains, $900 each,	14,400.00
6	Engineers, $900 each,	5,400.00
6	Asst. Engineers, $800 each,	4,800.00
24	Drivers, $800 each,	19,200,00
15	Hook and Laddermen, $800 each,	12,000.00
34	Hosemen, $800 each,	27,200.00
105	Total,	$89,150.00

Days off with pay: Three or 48 consecutive hours.
Area of city: 28.57 square miles.
Miles of streets: 400.
Population: Census of 1890, 81,434. Estimated 1898, 147,790.
Chief: C. F. Wall.

PENSION ROLL.

There are 16 pensioners, and the total annual roll is $6,144.

UTICA, N. Y.

	Permanent Force:	
1	Chief,	$1,200.00
2	Asst. Chiefs, $900 each,	1,800.00
1	Supt. Fire Alarm,	1,000.00
5	Captains, $720 each,	3,600.00
9	Drivers, $720 each,	6,480.00
4	Stokers, $720 each,	2,880.00
6	Hosemen, $720 each,	4,320.00
3	Laddermen, $720 each,	2,160.00
31	Total,	$23,440.00
	Call Force:	
1	Captain,	$200.00
4	Engineers, $400 each,	1,600.00
21	Hosemen, $150 each,	3,150.00
5	Laddermen, $150 each,	750.00
31	Total,	$5,700.00
62	Grand Total,	$29,140.00

Days off with pay: Thirty hours per month from November 1 to June 1, and 48 hours per month from June 1 to November 1, and ten days' vacation for privates; twelve days' vacation for officers.
Area of city: 7 square miles.
Miles of streets: 107.
Population: Census 1890, 44,007; estimated 1898, 60,000.
Chief: Wesley Dimbleby.

FIRE DEPARTMENT NOTES.

—Conrad C. Hoffmeier has been elected chief of the Cranford, N. Y., fire department; John C. Hummer, assistant.

—The fire commissioners of Binghamton, N. Y., have decided to give each employee of the department a week's vacation.

—George A. Slade and Ed. P. Teed have been reappointed chief and assistant chief engineers of the Stonington, Conn., fire department.

—The Mount Vernon, N. Y., firemen held their annual election of officers recently. Charles H. Heinsohn was chosen chief engineer for a term of three yars, without opposition. For second assistant chief there were three candidates, and Theodore F. Nesbitt was chosen. Daniel M. Dewitt was elected treasurer for three years, without opposition.

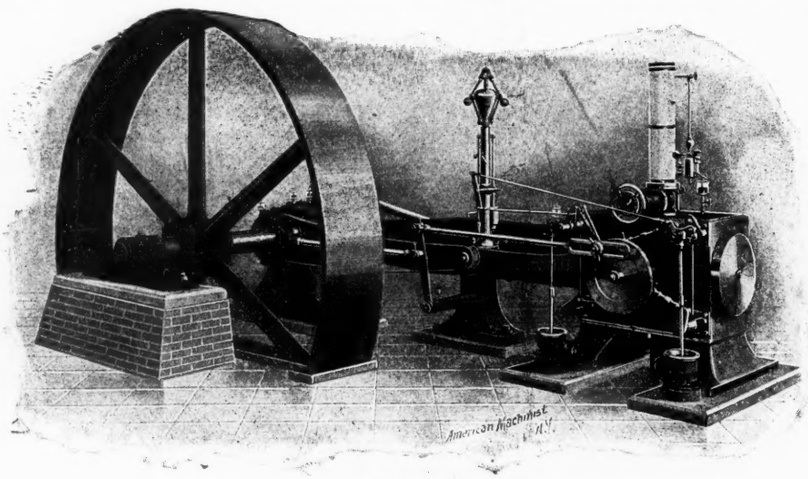
—All the fire hydrants in New York city are inspected monthly between certain dates, the inspection being made by the captains of the several fire companies, each inspecting the hydrants within his own district. A report upon the condition of each hydrant is made monthly after inspection to fire headquarters. If any hydrant is in need of repairs, the need is reported directly to the department of public works, which makes the repairs. If, however, they should not be made within a specified time, that fact is reported to fire headquarters. In winter, after a fire, a hydrant that has been used is pumped out and packed with salt so that it can't freeze up. In fact, in the care of the hydrants at all times, nothing is left to chance. They are kept always ready for instant and effective use.

—William C. McAfee, chief engineer of the Baltimore fire department, has a good plan for giving immediate aid to men injured at fires. He proposes that each district chief and the chief engineer should carry in his wagon a small case containing bandages, iodoform, carom, oil for burns, sutures, stimulants, needles, scissors, probes, aromatic spirits of ammonia, bichloride of mercury and such other medicines, instruments or antiseptics as may be pronounced necessary by the surgeon of the department, Dr. Alexander Hill, who heartily approves of the idea. The district chiefs can then be lectured by Dr. Hill on first aid to be rendered the injured, and can be readily be taught to take necessary temporary steps at any time. Dr. Hill responds to all third alarms of fire, but there is danger of firemen becoming burned or injured at any fire and in the absence of the surgeon.

—The twenty-first annual convention of the New Jersey State Firemen's Association was held at Atlantic City, September 14, with an attendance of about 600 delegates. The reports of the officers showed the organization to be in a most prosperous condition. The association pays out about $50,000 a year for the relief of disabled firemen and their families. President Bird W. Spencer, Secretary Horace H. Brown, Assistant Secretaries William Exall and T. Howell Johnson, Treasurer John McKiernan, and Financial Secretary G. T. Everett were all unanimously re-elected. The following were elected vice-presidents, one from each Congressional district: G. C. Mick, first district, Merchantville; George W. Mount, second district, Burlington; R. B. Storm, third district, Long Branch; H. B. Green, fourth district, Flemington; John J. Dupy, fifth district, Rutherford; William C. Astley, sixth district, Newark; James B. Applegate, seventh district, Hoboken; Isaac Seeley, eighth district, Westfield.

THE SIOUX CORLISS ENGINE.

The Sioux Corliss engine built by The Murray Iron Works Co., of Burlington, Ia., is, in the words of the World's Fair award, "admirably adapted to electric lighting purposes." The diploma mentions further these points: "Small clearance; high-speed governor; close regulation; excellent workmanship." All of which characteristics go to make a most desirable engine for municipal lighting stations, as the resultant economy of fuel and steadiness of lighting are the points most sought after. Combine these in an engine that will run for years without repairs and you have a perfect machine for furnishing light and power. It is no exaggeration to say that 75 per cent. of the municipal lighting stations in the middle west are using Sioux Corliss engines, and the number is being increased by weekly shipments from the Burlington shops.



THE SIOUX CORLISS ENGINE.

The Murray Iron Works are well known also as manufacturers of tubular boilers of the best class, and they make a specialty of equiping power plants complete with engines, boilers, heaters, pumps, piping, etc.

Extra copies of the August and September numbers of CITY GOVERNMENT, containing the addresses delivered at the League of American Municipalities Convention, can be obtained at this office.

TRADE NOTES.

—The New Jersey Car Spring and Rubber Company recently sold 2,000 feet of fire hose to the city of Camden, N. J.

—The Minneapolis council have purchased 3,500 feet of Paragon cotton hose from W. S. Nott & Co., 1,000 feet of Hudson cotton hose from the New Jersey Car Spring and Rubber Company, and 500 feet of Baker fabric hose from the Gutta Percha and Rubber Manufacturing Company.

—The New York fire department has received and placed in service another Champion-Babcock chemical fire engine, for which it recently contracted with S. F. Hayward & Co., of New York.

—The executive committee of the Suburban Underwriters' Association recently voted to make an allowance for the Gamewell auxiliary fire alarm box system with watchman of 7½ cents, and when supplemented by the Montauk multiphase thermostatic cable without watchman, 10 per cent. If the rate is over 1 per cent., the reduction is 7½ per cent. on box and watchman; 10 per cent. for box and cable without watchman.

Electric Light Proposals.

CITY CLERK'S OFFICE, Camden, N. J.

Sealed proposals will be received at the City Clerk's Office, City Hall, Camden, New Jersey, on Wednesday evening, November 16, 1898, at 8 o'clock, and then publicly opened, for lighting the streets of the city of Camden with incandescent and arc electric lights for the terms of one, three and five years, beginning July 1, 1899.

Specifications can be seen on file at the City Hall in the City Clerk's office.

Each proposal must be accompanied by a cash deposit or certified check to the amount of $1,000 on the bid for the one year estimate, cash or check for $1,500 on the bid for the three year estimate, and cash or a check for $2,500 on the bid for the five year estimate, conditioned that the party making the bid will execute the contract.

The Committee reserve the right to reject any or all bids, and to waive any defect or informality in any bid should it be deemed to the best interest of the city so to do.

Address proposals marked Electric Lighting to

CHARLES C. SOUTHARD, Chairman.

Dated September 22d, 1898.

F. C. AUSTIN MFG. CO.

MAIN OFFICE & WORKS

HARVEY, ILL. U.S.A.

SUBURB OF CHICAGO.

The Austin..... Street Sprinklers

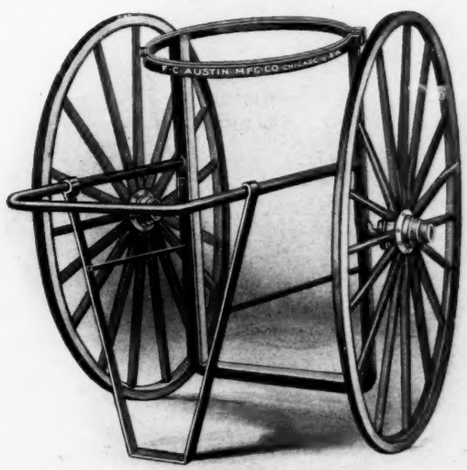
Are the best and most effective. Our new Springing Heads can be adjusted from a light to a heavy spray by the driver without stopping the team. Has structural steel frame, Concord steel axles, Sarven wheels, steel or wood tank.

Austin..... Asphalt Cleaners

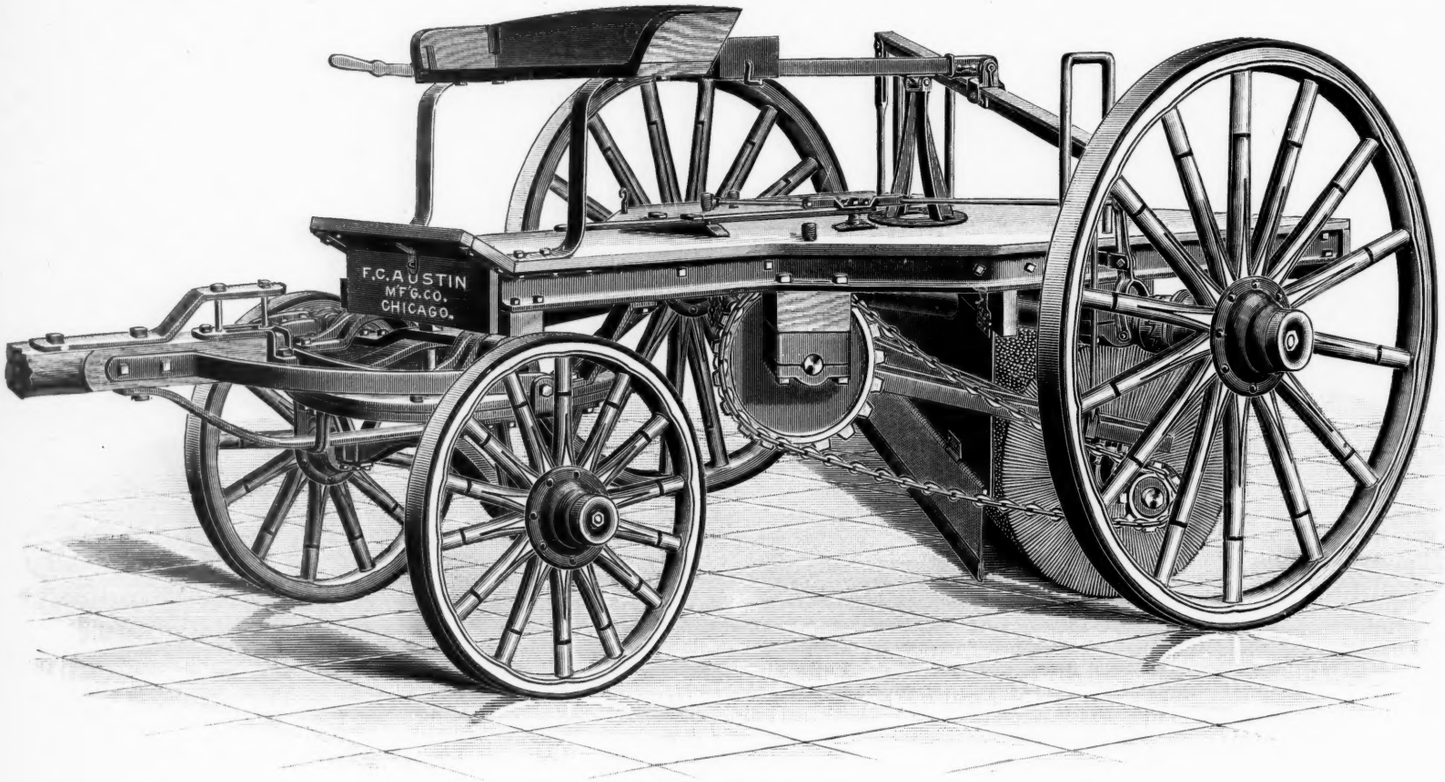
Are made of steel, run on rollers, and will last longer than any other Asphalt Cleaner made.

Austin... Bag or Can Carrier.

Used in connection with Austin Asphalt Cleaner. When bag is filled, another can be put in its place.

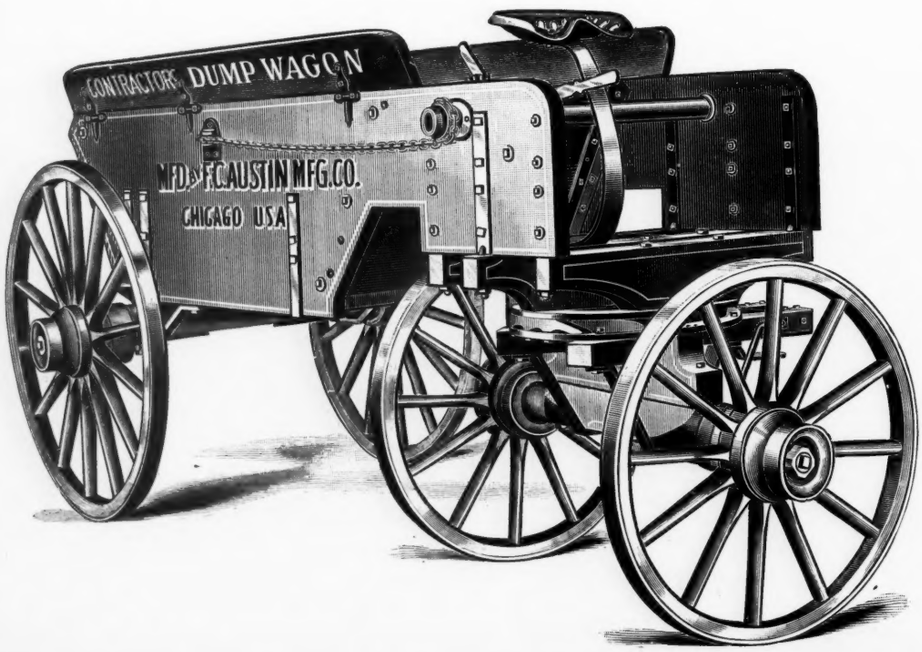


HIGHEST AWARD—WORLD'S FAIR, CHICAGO, 1893.



The Austin Steel Street Sweepers.

Adapted for sweeping any kind of pavement. Can furnish hickory fiber, rattan, bass or steel broom. Made in two sizes. Austin Standard will sweep 6½ feet wide. Austin Special will sweep 7½ feet wide.



Contractors' Wagon...

Is Especially Adapted for Street Work. Will Dump the Load without Stopping the Team.